

AVIATION WEEK

OCTOBER 3, 1949

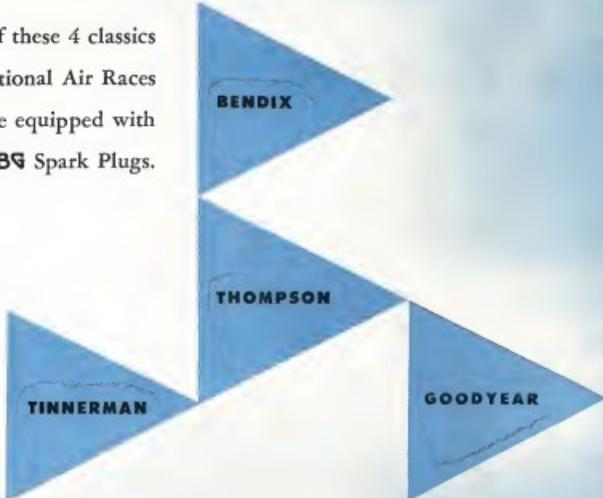
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AIRCRAFT DIVISION . . . WILMERDING, PA.



The brake that puts a stop to high maintenance costs

SHOWN above is one of the B. F. Goodrich assemblies on Trans World Airlines' Stratocruiser fleet, now being converted 100% to B. F. Goodrich brakes.

This is TWA's first experience with BFG Expander Tube brakes. But already the results are clear. Maintenance men report an important reduction in maintenance.

The secret is the simple design of the B. F. Goodrich Expander Tube brake. Many extra parts and linkages

found in other brakes are eliminated in BFG brakes. The only tools needed to replace them are a screwdriver and pliers. And because the Expander Tube braking action covers a full circle, wear is slower and spread more evenly. Maintenance men know, trying some losses and replacement costs are all cut.

TWA further reports that pilots like the "operational feel" and that a weight saving of forty pounds per airplane was realized over the

original type brake.

B. F. Goodrich brakes offer many other advantages, with special benefits for each type of aircraft—airline, military and personal. For help with your particular problem, write to The B. F. Goodrich Company, Aeromarine Division, Akron, Ohio.

B.F.Goodrich
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During the war, TITEFLEX made ignition shielding for practically every type of reciprocating engine and on military and civilian aircraft. Today there is scarcely an engine in the United States and Canada that does not wear TITEFLEX ignition shielding on at least a part of their equipment.

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Titeflex, Inc.

See Advertising Index, page 2, H. 1

Indicates membership of Military Airplane Products Purchaser's Council

Aviation Week

Volume 51

October 3, 1949

Number 14

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A Good Name to Know!

To the old timers in Aviation, the "good names" in know come immediately to mind. Planes, propellers, gasoline systems that have proved themselves through long, hard hours of performance in the air.

Phillips is one of those "good names". It has earned its reputation at the hands of men who bring on in the machine shop, are skeptics. Only a tested expansion such as this could explain the wide acceptance of Phillips Aviation Gasoline and Engine Oil among private, military and commercial fliers alike. The Austin Department, Phillips Petroleum Company, Bartlesville, Oklahoma.



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**TRUSCON Standardized
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**Prompt delivery of TRUSCON
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within certain size limitations
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Truscon Standardized Steel Buildings are now available on Series A design of widths one-everything 10 feet, in lengths up to 40 feet (15 inches and any length in multiples of 10 feet). They are built in two basic types of steel frame construction with insulation and weatherproofing. These Truscon Steel Buildings are used for all kinds of industrial and commercial purposes because they offer low cost, long life, low maintenance, and a wide range of low options, low cost, high initial value. And Truscon Steel Buildings have a high safety rating which permits them to be dismantled and re-erected in an entirely new location.

Write for complete information today. Truscon engineers will be glad to make suggestions and help you select the building that fits your needs.

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WHO'S WHERE

Fairchild Restaffing

Fairchild Engine & Airplane Corp. is restaffing its management ranks following the recent change in ownership. William L. Endres has been appointed assistant general manager of the aircraft division. Floyd S. Remond is the new controller of the division, and George A. Bitchler the director of customer relations for the corporation.

Endres and Remond have been with Fairchild's aircraft division. Endres has held sales manager since 1941, and Remond first went to the division's advertising department in 1946. He now becomes also vice president and assistant controller of the corporation.

Bitchler until recently was domestic sales manager at Douglas Aircraft Co., which he joined when released from the Air Force in 1946.

Shortly after taking over his new job, Endres assumed responsibility for A. Bartholomew in his capacity as the point of origin manager in charge of production of the C-119. Bartholomew has been with Fairchild's aircraft division since 1947 and prior to this was with North American and TEMCO.

Changes

Abe Silverberg has been named chief of research at the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics. He has been chief of the wind tunnel and flight research divisions at the lab. He takes over the job of Dr. M. R. McCormick, transferred to NASA's Washington office.

W. F. Gossling, vice president of Control Wright's repair division, and R. W. Young, vice president-engineering of Wright Avia-works, have resigned.

Joseph J. McElroy, former assistant secretary and director of the Bureau of Personnel, has been retained as a consultant engineer. In April P. Adams and Associates, aviation consultants.

Walter E. Böhrer has been named consultant of Smithsonian's flight operations for United Air Lines. UAL expects to start Böhrer's consulting work in October by the RAF.

New Directors

Glen W. Miller Co., Elmer J. Gardner son, chairman of the Reconstruction Finance Corp.; Chester F. Buckley, president of the Devon Chemical Corp.; Daniel A. Frost, vice president-financial of the Martin com-pagny.

INDUSTRY OBSERVER

This week's column is devoted to the operations of American firms who have been turning British aircraft and engine parts for or at the request of British programs in these fields.

► New figures on the most powerful single-seat fighter in the world—the Gloster Meteor powered by two 1730-hp Bristol Rolls-Royce Avon engines—give at a rate of climb of 46,000 ft, as less than five minutes. This is just about double the present rate of climb for the North American F-86A, the latest USAF jet fighter in service.

► Although there is still considerable controversy regarding the future of the propeller in aviation, both de Havilland's principal aerofoil research team (Sofar Ltd.), joint controllers of Bristol and Rolls-Royce, and de Havilland Propellers Ltd. are involved in considerable aerofoil research and development facilities. De Havilland is building research and test facilities at its Hatfield plant aimed at handling propellers for gas turbines delivering up to 10,000 hp.

► Current feelings between the two sides of the de Havilland Coast liaison staff, that planned to many days observation at the SBAC Farnborough show, are mostly temporary fillings to plug the holes that will eventually be filled by two de Havilland-Spitfire aircraft for trials of boost. The Spitfire is a 935 hp liquid-cooled piston developing 9000 lb thrust for 12 seconds and can be controlled by the pilot from the Comet's cockpit.

► Vickers Armstrongs Ltd. Viking transport design has turned out to be a big money-saver since a shilly stage when the transport was built, put together wing, fabric-covered Wellington fuselage wings and Woodstock bomber tails. Now an affiliated job, 167 Vikings are in service service and Vickers is building 400 military versions for the RAF (Vulcans) and another hundred narrow-finned version (Vulcans). RAF will use the Vikings to replace its DC-3 transport fleet.

► De Havilland will shortly commence production orders for both its Venoms (D.H.112) and its night fighter version of the Vampire (D.H.113). Although designed primarily as a light-bomber, the Venom has proved unusually successful as a maneuverable fighter at altitudes above 42,000 ft. This is due partly to the low wing loading (82 lb #) and the early-breathing, high altitude qualities of the Rolls-Royce Ghost turboprop that powers the Venom. The company has recently acquired a new assembly plant at Chester to handle its expanded production of the Vampire series taken over from English Electric and the Cheshire, Cheshire-designed primary trainer ordered by the RAF.

► Vickers Armstrongs Supermarine jet naval fighters (the Attacker) are a pair of spindly-looking aircraft that look like the flying saucers of science-fiction movies. Walter E. Böhrer has been named consultant of Smithsonian's flight operations for United Air Lines. UAL expects to start Böhrer's consulting work in October by the RAF.

► A. V. Roe Co. Ltd. will build a small quantity of Tudor IX transports, powered by four Fiat turboprops in twin-sleeper configuration in the Tudor VIII fuselage plane, but will feature a tricycle tandem-wheel landing gear. Ministry of Supply plans to use the Tudor IX in its expanding program of research into operational problems and economics of transport aircraft. Vickers-Armstrongs Ltd. has concluded the contracts of its Transporter aircraft and is awaiting engine delivery from Rolls-Royce.

► British have only recently returned their interest in afterburners after taking initial efforts along that line in 1944. The experimental afterburner installation on the Gloster Meteor and de Havilland Vampire began flying only during the past year. British officials claim they have been getting as high as 67 percent additional thrust from these afterburners in test runs, and 50 percent in flight tests.

A TWIST OF THE WRIST



and the NARCO gyro range navigation receiver will take you safely to your destination. It's so easy to operate and so dependable and accurate that it makes every cross country flight a pleasure trip. It's safer too, for you don't get lost when you contingencies.

Write today for the news and address of your nearest NARCO representative who will be glad to demonstrate this amazing development and we will send you catalog #218, describing NARCO products.

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NATIONAL
AERONAUTICAL
CORPORATION

WINGS FIELD, AMBLER, PA.

AVIATION CALENDAR

- Oct. 13-Twentieth anniversary meeting, Society Novel, Midland Hotel, New York.
- Oct. 14—Annual members' flight from Newark International Airport, Hotel Lincoln Plaza, New York City.
- Oct. 4—Conventions to Airlines and Airport Personnel of National Pilots Protection Association, Wings Club, Hotel Belmont, New York City, 10 am.
- Oct. 7-8—10th annual scientific meeting and aircraft engineering display, Bellanca, Los Angeles.
- Oct. 7-8—American Air Mail Service, exhibits and conventions, Edgewood, North Bend, Oregon.
- Oct. 8—Circle of American Airlines Day, sponsored by American Council, Garden Room, Hotel Ambassador, Indianapolis, Indiana Field, I-1, N. T.
- Oct. 12-13—Air Reserve Army convention, Long Beach, Calif.
- Oct. 13-15-1949 conference on airport management and operations sponsored by University of Southern California and Southern Flight Management Bureau, Los Angeles.
- Oct. 13-15—Eighty-third Annual Convention, Air Line Dispatchers Assn., Congress Hotel, Chicago.
- Oct. 27-31, meeting, New York State Aviation Council, Hotel Stevens, New York City.
- Oct. 17-19—NACM steering committee meeting, Detroit, Mich.
- Oct. 17-18—Fall meeting, American Society of Testers, Midway Convention Center on 10th Street, W.C. 10, Washington, D.C.
- Oct. 18-19—NAS annual meeting, Wright-Patterson AFB, Dayton, Ohio.
- Oct. 23-25—CIAO—Confederation of Italian Airlines, Convention meeting, Florence, Italy.
- Oct. 26-28—Third annual San Francisco Air Fair, sponsored by Junior Chamber of Commerce, San Francisco, Calif.
- Oct. 30-Nov. 3—Annual convention, National Ass'n of State Aviation Officials, New Orleans.
- Nov. 9-11—Sixty-first annual meeting, American Distributors and Manufacturers Ass'n, Hotel Springfield Woods, French Lick Springs, Ind.
- Nov. 30-Dec. 2—Annual meeting, Society for Experimental Stress Analysis, Hotel New York, New York.
- Jan. 13-15, 1950—18th Annual Ass'n of Motor Vehicle Insurers, Miami Beach, Fla.
- Mar. 6-8, 1950—17th annual meeting, American Bus Builders' Ass'n, Norden Hotel, Flushing, N.Y.

PICTURE CREDITS

- 15—National Weather Boardroom, 15-16—Globe to Jupiter, the 15, 16, 17, 18—Flight, 18—The Pilot, 18—Lancaster, 18, 21-22—Pilot's Handbook, 22—Control Aeroplane.

LODESTARS CONVERTED

by
JOHNSON AIRLINES



Typical of the fine conversion work done by Southwest Airlines is this performed on Lockheed Model 10 Electra 10A, Inc., of San Antonio. The beautifully appointed cabin and custom designed flight deck are seen here, styled and constructed by the Texas Service Representatives of SAC, in complete contrast to the interior which SAC can fit in the 1946 Electra 10A.



Most airplane interiors are curiously squat-looking and really cramped.



Instrument panel, cockpit decked out in a simple plane.

Ready for refueling, because there's no fuel tank in the fuselage.

Southwest Airliners Co.

NEWS DIGEST

DOMESTIC

Wright Aeronautical Corp. has received an order from Douglas Aircraft Co. for Cyclone 9582 engines to power eight new Super DC-3s for Capital Airlines. Delivery will begin in January.

Cessna will apply for new CAA type certificates on Convair Liner, permitting operation in gross weight from 46,000 to 41,200 lb. and landing weight from 36,000 to 39,500 lb. as soon as tests are conducted on modified Liner. On short hauls, the Liner will be able to carry about twice as much as its present load from present \$150 ps. For long-haul, payload increase would be 51%.

Douglas Aircraft Co. is planning to bring out DC-8s, passenger version of DC-6 freighter. Both A and B versions named regular DC-8s length 36 ft. DC-8s will carry more than 100 passengers, cruise at 180 mph, have range up to 2,900 mi., and will be powered by four Pratt & Whitney engines.

Boeing Airplane Co. delivered its 25th Stratocruiser Craft with 76 of an order of 100 for Northwest Airlines. First American Airlines has received its first Stratocruiser, an order of 10. Douglas Commercial Aircraft Corp. has ordered 10, United Air Lines.

Personnel aircraft shipments during August, reported to Aircraft Industries Ass'n, totalled 208, bringing total for first eight months of 1949 to 1,512, valued at \$19,900,000. August shipment was from nine companies and included 177 Beechcraft, 73 two-place, and 18 unpowered, equivalent in value of \$1,030,000 at manufacturer's net bill price. Shipments of nine companies in July totalled 206, valued at \$1,347,000.

Cessna's T-37, first of 76 ordered by Air Force, has entered operational flight test in navigation trainer version of Convair Liner.

Loyaleplane altitude record of 36,290 ft. was claimed by 22 year old Miss Mildred Zimmerman of Roslyn, Pa. Official record is 21,900 ft.

Lockheed Aircraft Service has acquired all stock of Willys-Overland, distributorship agents at New York International Airport (Midfield), commonly known craft for Suburb and West Coast Royal Dutch Airlines, Swissair, El Al, British Overseas Airways and American Overseas Oil Co. Biddeford installation will be conducted with LAS overall based at MacArthur Air Park, Bayville, N.Y. and Bradford, Calif.

Zane Render, Sperry Gyroscope Co.'s

navigation and landing device, is planned for installation in all Eastern Air Lines planes by first of next year.

Beech Aircraft Corp. has again turned to Wisconsin Institute in quest for Wichita Beech Bomber in which Bill Gober is a new member rated for lightplanes.

Defense Secretary Louis Johnson, who spent a day on a Navy aircraft carrier, said he was impressed, but that there is still "not a chance" he will vetoise order skipping word on super carrier.

Minion Robbie, age 50, one of the first aviation writers died in a Chicago hospital. He was president of the Aviation Writers Ass'n in 1944-45.

34th Modello Memorial Medal will be awarded to Andrew Kallioleos of Field Aircraft Engine & Airplane Corp.'s NEPA division, as Off. 7, in Society of Automotive Engineers' National Aerospace Meeting, Los Angeles.

Vice Adm. Alan J. B. Solomons commanded the air force, Pacific Fleet, last summer. He was granted leave from command in 1947 and returned to fly in 1951.

New York helicopter service application will be heard by a CAB examiner on Nov. 14. Seven companies have requested routes, but some may withdraw from the anticipated proceeding.

National Aerospace Ass'n board of directors is sounding out aviation opinion an report for a national air base meeting tentatively planned for Dec. 15-17 in Washington in the 1949 successor to previous national aviation clinics.

INTERNATIONAL

Toronto Canada Airlines has started daily five flights from midnight Wednesdays at each week over all domestic and Canadian flights.

Royal Airlines can be engaged via a single company liaison at "Socialist Arms Bureau," with confirmation of 3 hours for KLM holds 30 percent interest.

Quebec Airways DC-3 craft last month which killed 23 was caused by explosion of a time bomb in the baggage compartment, according to Royal Canadian Mounted Police. Officials

of El Al, Montreal, Airline of Israel and Airline-Aerospace Oil Co. Biddeford installation will be conducted with LAS overall based at MacArthur Air Park, Bayville, N.Y. and Bradford, Calif.

The famous heat-beating Deltaflight line includes wires and cables designed for power, lighting, and communication systems, and for instrument wiring. It would be interesting to know where this cable is being used. Interestingly, last year, the W-3-192 Construction Materials Department, General Electric Company, in Bridgeport, Connecticut,



gives
extra heat protection
in limited space

because it's built
to beat the heat



Where wiring space is limited and ambient temperatures are high, use Deltabeston and let the extra heat protection of this metal-dissolve, flame-aluminum-treated aircraft wire work.

The layout of flame-aluminized, flame-dissolving materials often requires compacted glass fiber and an overall flame-retardant finish made Deltaflight extra tough, extra high in insulation resistance. Triple-silicone treatment also gives Deltaflight an unusually high degree of stability from the point of view of temperature and electrical short circuit resistance, because the glass fiber has the same properties of silicon varnish.

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Three-Jet XB-51 Shows Unusual Design



Martin fighter-bomber has variable incidence wing, high tailplane.

Most unconventional jet aircraft designs produced in the U.S. is the new three-jet XB-51 ground-attack fighter-bomber announced by Glenn L. Martin Co.

A variable-incidence wing on the XB-51 and the unusual position of two of its three General Electric J-47 turbojet powerplants, mounted on pylons extending from the fuselage, together with the placement of wing and tail surfaces, give the white craft a radically different appearance.

The variable-incidence wing is at the top of the tail, and the tandem main landing gear which extends into the foreplane tail to the wingroot of the design (No. 3 engine is mounted more conventionally low at the tail of the plane).

Use of variable incidence in aircraft wings has been subject of experiments for many years. In 1941, the first Wright "Bachann" planes with wing-swinging devices won the endurance of three plane awards.

►Cordier Plane: Available the first practical application of this variable-incidence principle was made in the Canadian "Ice Wing" built during the early 1930s.

This monoplane was flown several years ago, several thousand hours, from Canada and Long Beach.

Later George Cordier, in research, used a modification of the principle in his personal plane, the Malard. (Aviation News Sept. 28, 1943) and his XPG-1 fighter-bomber glider, both built at Davis, Calif. Both used the evidence of softened wing panels.

►Grossi Theopold: Germans from Elstert and Vinn built two variable-



incidence wing iron-engine transports in France during the war (Aviation News, Nov. 26, 1948), but neither was built. Most recently British Supermarine 302 torpedo bombers and Supermarine Strato fighter-bomber amphibious aircraft have variable incidence wings.

►Basic Advantage: Clash of these two types of variable incidence has been for the benefit of airmen.

Martin engineers never have been quite certain regarding the detailed technical requirements of the variable wing. It began as an Air Force design study in 1947 and this study was followed by a 1948 static strength and vibration program in the XB-51 airframe. This was one of three such government studies planned: the Convair X-1 (which later became the XP-80) and the Convair YA-46 (which became the XB-51 having made its first attack mission last year as the XB-51).

►Wing Systems: The XB-51 wing features the use of spars for lateral control, although the design uses a simply flat plate forward of the trailing edge root, although no spar is associated with the trailing edge flap, as associated with the Martin AM-1 Mars. Control surfaces in itself, however, are not yet determined. The lower control surface will be ailerons, while the upper control surface will be elevators.

Further, it allows slightly higher maximum speed by permitting the empennage function to assume a minimum drag attitude while the wing is at its zero lift condition.

Principal objection to this feature is the structural problems created since one of the wing spans must be moveable about the centerline. While possible solutions have been suggested, the XB-51 designers prefer the fixed span—which is more logically linked with a swept-wing configuration—about the year 1950.

►More Patents: No details are available as to the mechanism, but the inventors patents cover for such a device over the past 40 years are known to have covered Martin engineers and attorneys considerable head-scratching during the decade.

The XB-51, in other respects, is the last of the wartime jet aircraft projects approved by the Air Force on the basis

of random proposal as distinct from the product of a formal requirement.

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►Cordier test pilot:

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Further, it allows slightly higher maximum speed by permitting the empennage function to assume a minimum drag attitude while the wing is at its zero lift condition.

Stabilizer location atop the fuselage set well above horizontal tail spar prevents maximum longitudinal control when a turn is needed. The location while structurally difficult, has satisfied installation in the Convair 340/350 and the German DFS 194 (copied by the Russians) as a result of the lack of space in the rear fuselage.

►The French: Aircraft aboard the XB-51 is interested in an interchangeable arrangement of eight 20-mm. or four 30-mm. cannons in the nose. A storage of bombs up to 12,000 lbs. is carried in the bomb bay located between the main landing gear pods. Crew of two includes pilot in bubble canopy seat, fuselage and navigator radio operator seated at a station in the fuselage behind and below the pilot.

The XB-51 has a gross weight of approximately 55 ft. and a gross weight of 50,000 lbs. Gross weight is approx. 80,000 lbs. Speed is 600 mph at sea level.

Craft features 35 deg sweep in its wing and empennage. The fuselage nose gear first developed on a modified Convair 340, has been lengthened and strengthened and fitted with the Martin XB-51 and Boeing XB-47 tails, removed and onto the fuselage. Small, retractable waist landing gear cause minimal weight damage during ground movement.

An intake for the aft engine is located atop the fuselage. A temporary ventral fin is present in place over the inlet, until the tail merger will be built during initial test flights.

Swivelling Landing Gear

Recently installed in the experimental landing gear field is the experimental model of the Goodyear swiveling landing gear for DC-3 type planes which now has a pedistal control to make the nose wheel alternately steerable at the pilot's pleasure, for greater ease in turning.

Art Chapman, Goodyear test pilot who has done almost all of the flight work for his company on this three-year development, demonstrated the an proved gear on a Goodyear-owned DC-3 at Washington National Airport recently to a delegation of CAA, Air Force and industry observers and one of Aviation Week's editors.

Advantage of the new hydraulically-operated landing gear is that the landing wheels stay in a parallel case as shown when the plane is turning.

If the pilot leaves the lock on as flight, the swiveling gear will turn in the direction of a crosswind landing, so that the wheel will be free to turn. Conversely, if not unlike those familiar to pilots for use with follow-swinging tail wheels which alternately can be locked for stability.

Goodyear has produced approximately 10 sets of the DC-3 nose swiveling gear which are being marketed at a price somewhere around \$6,000 installed. Currently the company has installed seven big sets on demonstration aircraft, including one each by Goodyear, CAA, NACA, Canadian government, Society for Experimental Aerodynamics, the Australian government, and the Royal Canadian Air Force.

Approximately 50 smaller size sets of swiveling wheels, in addition, have been shipped for the use on a wide variety of personal aircraft.

Details of the Goodyear arrangement which permits the Goodyear swiveling wheel to rotate freely within sides governed by stops, have been previously reported in *Aviation Week*.

Air Force Negotiated Contracts

The Air Force has announced its AVIATION White negotiations of millions of dollars worth of contracts. The following list shows those over \$100,000.

Annotated in August

- Aerospace Corp.**, Torrance, Division, General Electric Co., Westinghouse Man., 510,800, 10 Jan 49
Aero Products, Inc., Milwaukee, Wis., grants the exclusive license agreement, 515,800, 29 Jul 48
Alkathene Mfg. Co., Great Neck, Long Island, Calif., adds to its production facilities, engineering, design and design and development of aircraft components, 515,800, 29 Jul 48
Aluminum Mfg. Div., General Electric Co., Los Angeles, Calif., adds to its design, storage, handling and test equipment, facilities and manufacturing, 515,800, 15 Aug 49
American Gas Association Co., Elkhorn, Neb., 100% nonresident, assets, \$100,000, 22 Jun 49
Bell Aircraft Corp., Niagara Falls N. Y., signs parts for the B-17 G, B-24, B-25 and B-17D aircraft, 516,011-23, 15 July 49
Bendix Aviation Corp., Newark, Calif., carburetors, fuel injection systems, propeller controls and spare parts for each of B-17G, B-24, B-25, 28 Jul 48
Bendix Aviation Division, Bendix Aviation Corp., South Bend, Ind., fuel injection system and spare parts, 567,213, 23 July 49
Bell Electric Corp., Cleveland, Ohio, 101,275-108,12, 511,2000, 13 Jun 49
Bell Ind., New York N. Y., type 1200, serial no. 35-1000, 10 Aug 49
Bengt & Stenius Corp., Milwaukee, Wis., engine assemblies and component parts for B-17 aircraft, 510,800, 28 July 49
Cook Electric Co., Chicago, Ill., 39 class magnetic type starters, 514,800, 27 Jun 49
Corliss-Wright Corp., propeller division, Cleveland, N. Y., propellers assemblies, less propeller hub, for the P-51C, P-51D and P-51E aircraft, 518,800, 30 Jun 49
Corliss-Wright Corp., propeller division, Columbus N. Y., modification of 972 blades and 480 hub required for B-18 series as aircraft, 517,711, 26 July 49
Consolidated Aircraft Industries, Inc., San Diego, Calif., 100% nonresident, assets for B-36 aircraft, 510,000, 15 Aug 49
Dayton Aviation Products, Inc., Dayton, Ohio,刀片 assemblies, propeller and engine improvements, type 1-C and type 1-E, 500,223, 29 July 49
Douglas Corp., Chicago, Ill., nonflammable hydraulic equipment, 512,277, 29 Aug 49
Douglas Aircraft Co., Inc., Santa Monica, Calif., spare parts for DC-5 aircraft support equipment, 510,800, 15 July 49
Duffy Construction Co., Cleveland, Ohio, signs a license for No. 2, \$10,000, 20 Jun 49
Eagle Felt Products Co., Bridgeport, Conn., L.I. mineral wool
Edison Electric Illuminating Co., New York N. Y., 100% nonresident, 5104,227, 22 Jun 49
Elgin National Clock Co., Springfield, Mass., 514,800, 100, 24 Aug 49
Emerson Electric Mfg. Co., St. Louis, Mo., 100% nonresident, 517,140, 28 Jul 49
Endicott Electric & Mfg. Co., Nanuet, New York, grants permission, 5104,227, 22 Jun 49
Fair & Bruns Protection Indus., Cincinnati, Ohio, 515,227, 5 Aug 49
Jaworski Metal Corp., Paterson, N. J., 100% nonresident, equipment, 5151,855, 2 June 49
Kollmorgen Instrument Div., Sprague D. C. Electric Co., Stamford, Conn., 100% nonresident, instruments, 518,807, 4 Aug 49
Liquidated Assets Service, Inc., Brooklyn, Calif., operation and ownership of Kollmorgen, April, 512,277, 135, 126, 49
W. L. Marmon Corp., New York, N. Y., 100% nonresident, 510,800, 28 Aug 49
McCormick Field Corp., Fort Meade, Md., 100% nonresident, 510,800, 22 Jun 49
Northrop Aircraft Corp., Hawthorne, Calif., facilities for production of P-51A aircraft, 511,160,800, 28 Aug 49
Pan American World Airways, Inc., New York, N. Y., operation of Eastern Field Airport, Liberia, 510,800, 15 July 49
Polar Industries, Huntington, W. Va., western station, stations, 514,253, 15 July 49
Ranger Aircraft, Fairchild Engine and Airplane Co., Indianapolis, Ind., 1, N.Y., 100% nonresident, 512,711, 9 Aug 49
Sonicola Magnetic Division, Brush Aerospace Co., Shirley, N. Y., signs parts for magnet and spoolines business, 509,800, 15 July 49
Stearman Aircraft Co., United Aircraft Corp., Holbrook, Conn., made design modifications and test of 15HP in H-36 helicopter to permit serial use of spools in each of the helicopter's main control system, serial, 517,177, 29 July 49
Taylor Hobson Ltd., London, Eng., 100% nonresident, 510,800, 28 Aug 49
 Mach. synchronization and ring system for military aircraft and component parts, serial, 514,914,800, 15 July 49
Sparta Corporation Co., Sparta Corp. Const. Ind., L. L. N. Y., 50,500,223, 15 July 49
Sparta Corporation Co., Sparta Corp. Const. Ind., L. L. N. Y., 511,200, 22 Aug 49
S. V. S. Engineering Co., Chicago, Ill., 100% nonresident, 519,121, 15 July 49
St. Louis Mining Company Co., Chicago, Ill., nonflammable spray paint for 3M aircraft, 511,277, 24 Aug 49
Well All Steel Products Co., North Hollywood, Calif., 100% nonresident, engine and transmission parts, 510,800, 22 Aug 49
Wright Aeronautical Corp., New York, N. Y., 100% nonresident, 5104,227, 15 July 49
Western Electric Co., New York, N. Y., telephone services, 513,300, 15 July 49

Annotated as July

- **Aerospace Service Corp.**, Valley Station, N.Y. (all parts), \$68,572
- **Boeing Airplane Co.**, Seattle, sequential and time parts, \$93,731
- **Boeing Airplane Co.**, Seattle, serial number plates, \$20,360
- **Buddy, E. S. Mfg. Corp.**, Newark, N.J.



Design Report on Canada's Avro Jetliner

U. S. airlines eye outstanding construction and excellent performance demonstrated in tests of short-haul C-102.

By Irving Stone

MALTON, ONTARIO - Progress made with A. V. Roe Canada Ltd. to short-to-medium range XG 102 plane, our northern neighbor in the field of jet transport development. And H. J. Johnson, at this call it-on the American question-can be taken as a clear indication that the U. S. is neglecting to develop the role for which it should be preparing in the future transport field.

and dispelling any idea of stages.

After leaving the field at about 50 ft at a speed of about 250-300 mph the plane dived sharply.

► Note, Vibram Low-Concentrated
in the quiet within the outfit. An
eight-trigram A W Baker
Sound and vibration conditions are
stable, that immediately after taking
out, with undisturbing attached and
turning down closely. The sudden drop
in noise level and vibration are so per-

It is claimed that noise—a low-frequency disturbance—doesn't become a Rician signal until at least 10 dB above the noise level.

Ministatus: This—Another representation feature is most convenient for the following configuration, mentioned earlier underlines. Because it is based

owers may catch from the ground. With the large enclosing panels dropped, machine's work or engine, loader and excavator controls will be greatly simplified. And rotators plug system located at engine section and front power machine at cockpit floor deck with ground men.

One of parts standard in the U.S. aircraft industry has been stressed to rapidly familiarize and change to commercial

* Performance-Speed, at 100%, is one of the main publications for the Jet Team.

Its maximum cruise is expected to be 407 mph at 38,000-39,000 ft at gross weight of 58,000 lb. Stalling speed at leading weight of 58,000 lb with flaps up in landing position is 87 mph. At leading weight of 40,000 lb, it is 75 mph.

Normal range with 50 passengers, baggage and all allowances for tuning and takeoff, landing, fuel for alternate, and instrument approach, is estimated at 780 nm. Maximum stellar range, without emergency allowances, is projected at 1400 nm.

The craft has been designed to operate from 4000 to 9000 ft altitude, under standard ICAN conditions.

Evening Comer Home-L is another association in the Jefferson has not established yet, but Arno feels that Eastern Au Lanes has displayed considerable interest in the outfit, following its development closely; also, feel it is likely that an arrangement could be made with EAL to place the Jefferson on their roster, which preferable to the net two-day

However, Asia is not greatly changing the sun's angle at this time, feeling that it has at least a year's leeway before this phase becomes important.

In that case the company expects to accumulate extensive data on maintenance and operating costs for the transport. For quantity production, part costs will probably be as in the neighbor plant at 5750 000.

because of greater fuel consumption would be substantially higher than those with piston or turboprop-powered transports, these would be considerably larger to reduce costs due to the jet liner's higher block speed.

An example of the craft's applicability could be illustrated in the high density Los Angeles-San Francisco run. An economics estimate that Jetliner block time would be 14 hr. for a morning speed of 400 mph., 20% fuel block, 14 hr., and 2 hr. 5 min. for the DC-4, showing a saving of 6 hr. to about 1 hr. with the jet liner.

Operational Benefits—Here are the advantages. Fuel will be节约 at the Jetliner because of its basic design.

- **Jet power.** No propeller purchase, overhead or maintenance costs; operation possible on wide range of low-grade fuels; simple engine installation, making quick change possible without regard to consumption, engine and control simplicity; increased aircraft reliability; sturdy undercarriage, affording reduced weight and ease of landing site selection, and reductions in parasite and induced drag.

- **Higher block speeds.** Faster aircraft means to keep the ground time of traffic-induced overtimes to a minimum; equipment, reduced crew expense on a given schedule, and savings in daily revenue charges.

- **Passenger appeal.** Quiet cabin, high pressurization, giving sea level comfort up to 20,000 ft., pressurizing fuel derived from 25,000 ft. with no pressure differential, "warm wall" heating, air being charged with a mixture, and trip times substantially reduced.

- **Pilot appeal.** Crossing points above

XC-102 Jetliner

Basic Data

Dimensions

	Length	115 ft sq ft
Wing span	60 ft	Net, 115 ft sq ft
Wing loading at 60,000 lb gross	100.0 sq ft	51.8 lb sq ft
Wing area	600 sq ft	98.0 sq ft
Aspect ratio	4.0	3.21
Fuselage length, overall	102 ft 0 in	102 ft 0 in
Fuselage diameter	10 ft 6 in	10 ft 6 in
Wheel track (mean)	22 ft 6 in	22 ft 6 in

Control Areas

Aircraft	51.9 sq ft	ft
Wing	231.2	ft
Engine, total	56.0	ft
Fuselage, total	38.6	ft
Total, fuselage & wings	325.8	ft
Landing flaps, outer wing	101.2	sq ft
Landing flaps, center section	21.5	sq ft
Dive flaps, middle (passenger section)	15.6	sq ft
Total landing flap area, outer wing and center section	128.8	sq ft
Total dive flap area, middle and center section	17.2	sq ft

400 mph, exceptionally high rate of climb, high acceleration possible on takeoff, normal landing speeds, engines can be started in 10 sec to starting altitude, and full afterburner reached with any two engines in operation, little tendency to pitch.

• **Performance.** The Jetliner's overall structural makeup is simple and straightforward. Use of completed castings and forgings are avoided, and, wherever possible, standard sheet and extrusion stock is employed.

• **Frontage.** About 18 ft. in diameter, a 9 per cent greater cross-section for the fuselage than the 20 percent of its length. Its four windows are located in front center position (forward of the center seat), all center seats, and rear are two (including lower 50%). are bolted together.

• **It can highest strength for the fuselage former rings, stronger are external to the outside former flanges, thus eliminating offsets and preserving strength continuity. Passengers sit spans of approximately 20 in. in the passenger cabin. Fuselage structure is around at 16 psi.**

• **External doors for passengers and crew are located on the port side of the rear end of the fuselage cabin. An additional door can be provided on the starboard side of the rear baggage compartment. Passenger cabin windows are two meeting slender double panes.**

• **Flight Deck.** Windshield structure is a high-strength aluminum alloy casting. The three center panels are of steel with construction, incorporating the "NEMA" system of electrical wiring. The vinyl cover insures protection being

mg weight of 32,000 lb, landing distance from a height of 50 ft., under these conditions, is expected to be 370 ft.

• **Freight Details.** The Jetliner's overall structural makeup is simple and straightforward. Use of completed castings and forgings are avoided, and, wherever possible, standard sheet and extrusion stock is employed.

• **Frontage.** About 18 ft. in diameter, a 9 per cent greater cross-section for the fuselage than the 20 percent of its length. Its four windows are located in front center position (forward of the center seat), all center seats, and rear are two (including lower 50%). are bolted together.

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• **Flight Deck.** Windshield structure is a high-strength aluminum alloy casting. The three center panels are of steel with construction, incorporating the "NEMA" system of electrical wiring. The vinyl cover insures protection being



LOW-MACH-JET: Large panels make maintenance easy, and



ENGINE REMOVAL: A simple cut along the top of cowling

released in the cabin in event of wind shear damage.

Wind-tunnel results on the nose canopy has shown a critical Mach number higher than that of the wing.

Instrumentation is grouped in a small area with auxiliary instruments of radio navigation and meteorological and flight landing aids. Main electrical power is to the rest with enough room of extra power capacity. An additional compartment is to the left of pilot and co-pilot and storage control panels to right of cockpit. Control levers provide for both electrical and radio equipment are accessible on the aft flight deck.

Each seat is adjustable fore and aft and sidesides fit one person. Office control columns avoid obstructing pilot's knees.

Missile assault batteries are located on the floor of cockpit. A probe is available for use.

• **Cabin Layout.** In the proposed 40-passenger version, double-deckable units of the standard type, with longitudinal seats, would be arranged on each side.

For high density work, it is expected that up to 90 passengers could be carried by using 5 seats abreast, with a 19-in. aisle clearance.

In addition to individual reading lights on underside of the luggage racks illumination would also be by ceiling lights and indirect underseat lighting.

A storage position is planned for the aft end of the cabin, with a sliding rear door. An instrument panel is located here for a second pilot, navigator and co-pilot, altimeters, oxygen flow indicators, and clocks. A panel with oil filter lights and lighting switches will also be

provided, as well as telephone connection with flight deck.

• **Air Conditioning.** Pressurization.

These are integrated into a completely automatic system. Either standard or non-moisture panel losses related to two cabin superchargers, one on each power plant gear box. Each supercharger has an air mass flow of 1,000 cu ft/min. at a differential pressure of 5.3 psi.

A constant air flow of about 60 lb per min. at all altitudes is maintained by automatic regulation. Either supercharger is capable of delivering that flow up to 15,000 ft.

Automatic control of cabin pressure is maintained by a discharge valve, to provide sea level conditions up to 23,500 ft. At 30,000 ft. cabin pressure is equivalent to 4,000 ft. altitude.

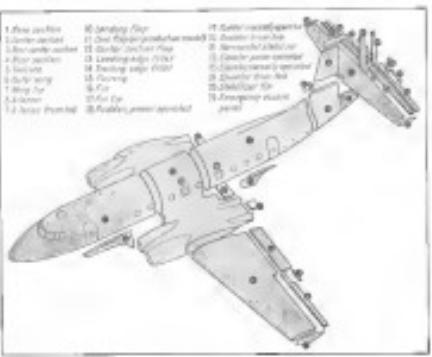
Ventilating air is temperature-controlled by equipment in the avionics compartment. Heat is supplied by a combustion-type heater of 200,000 Btu per hr. capacity. Cooling is ac-

complished by means of heat exchangers and a cooling boron.

Temper air is distributed to the cabin through the main supply duct to coil ducts which utilize the space between the forward ventilation blower and the cabin trim. Air is discharged above head level through a grille in the luggage area. Air enters from coils in the rear bulkhead. At either end there are two cool grilles. The air is freely discharged through a valve on the fuselage bottom.

• **Wing-Surface.** The plane is designed to a surface speed transport, a 200 mph gross load is made between high and low speed characteristics in service of the aircraft. It obviously was essential to fit the dog to a maximum and at the same time, obtain the high cost Cessna for takeoff and landing performance.

The second choice was a company truly think NASA series verbal, afford air sample fast along capacity. It is more difficult to have very high gear resistance



characteristics necessary for fast flying in rough air.

Wing load was considered but did not seem like too great a problem, because although it goes slightly better, extra camber decreases the effect of the extra induced drag at high speed and landing gear is less flexible, and manufacturing difficulties would also be increased.

The extruded wing slab takes care of leading edge and pressure plateau root stalling. On the production version, wing slots will have an outlet for outer heat, permitting removal of the air over the leading edge belly fairing surface area.

The wing is built in three main sections. Center portion is integral with the leading center section and carries the four powerplants. It is a proven naval fighter aircraft design that has been used in many types. Spirit of America, which carried the first flight board people, also of two-spar wings, are attached to the center section by continuous bolt-on joints. Heavy gauge skin and stringers afford high structural stiffness necessary for sustained speeds.

In the outer compartment, T-38T is used exclusively to insure maximum strength-to-weight ratio.

► **Task Aircraft.** Flaps—Two canted flaps are positioned between spans in each outboard panel. Total have a total capacity of 3830 gal. and may be folded during landing maneuver.

The problem of lateral stability was solved with canted, inverted and longitudinal applications of control made by Minnesota Mining Mfg. Co.

Airflow extends approximately 51 percent of the outer wingspan, one main influence being the flaps, and are positioned hydraulically with a ratio of 5 to 3. Internal main balance and a neutral tail.

The split-type landing flaps are hydraulically operated. Additional split-type dive flaps are fitted on the center wing, and also are scheduled to be installed on the left section of the noseplane in the production version. The split flaps on the center wing can also be used as landing flaps.

► **Double Rotors, Elevators.** The one passenger uses an upper and lower fin section with high horizontal stabilizer, double rudder and double elevator surfaces.

Lower fin, integral with the fuselage, is a two-fin, max-brace, three-web arrangement, with rudder lever gear slot for torsional rigidity. Stabilizer, also of two-fin webbing, is attached to the lower fin by high moment slot pins through steel mid fittings parallel to the span. The portion of the fin is fastened to the stabilizer by the same method.

Elevators are paneled rigid to the

blister, and have a double surface arrangement featuring fine slats to give 10° to 15° of roll for short takeoff and landing fine conditions. Roll axis is mounted manually, while the auxiliary (front) surface is power operated. Electrical trimmings are fitted, which can be operated manually if desired.

Rudder, composite two-molded surfaces, the rearmost hard-surfaced, and the auxiliary (front) power operated, and the surfaces are carried as piano hoods on the port side. Normally, the auxiliary surfaces are required, the auxiliary surface being brought into play only in the event of engine failure at low speeds.

A trim tab is provided, which can be manually operated during operation of the rudder surface, and electrically controlled when the auxiliary surface functions.

On the production version, the main vertical elevator or rudder position would reach the end of its travel and then cause the power-operated surface to move into play.

► **Possessions.** Two Dowell 5 jet engines are mounted in pairs in two underwing nacelles also housing the main landing wheel. Each engine is rated at 1500 lb static thrust at sea level, RICAN combustion.

Aerospace drives by the engines are mounted in each nacelle on a gear box located between engine and attached to the wing front spar. Oil tank and oil system are an integral part of the engine nacelle.

Upper half of the cowling is a pressurized structure provided with small access doors for an engine plug, and a stepped slot to permit access to the upper part of the auxiliary gear box. Lower half of the cowling consists of large panels swiveling to the left of the nacelle and use panel swaging to the engine, providing excellent access to engine and accessories. Panel on locked gear type, quick release features. The two main panels can be detached quickly.

Each engine can be replaced in about 15 min by accepting the jet power drive shaft, compressor, detaching the engine from the nacelle and lowering it directly to the engine gear.

The jet nozzle slopes down 7 deg to bring the jet line of sight at close as possible to the normal CO position.

The methyl bromide combustion gas valve for two shafts to each engine. A carbon dioxide fire extinguisher system is provided for the gas box compartment.

A water methanol system is installed to increase thrust by 10 percent under hot weather and power at altitude can double.

► **Fuel Systems.** Each group of two engines has its independent fuel system

fuel from any tank. However, can be delivered to any engine. The system is self-actuated and handled through two selector valves, each operating independently. When set for start-up, the selector valve is turned and fuel is sent from the four tanks. If switch is set at refuel tanks, the selector valve is required from external to allowed tanks, then to engine. Setting would be for unburned tank only when that tank's fuel set to be used for any two or all engines.

A signal light gives pressure pilot to check continuously the operational condition of the fuel system on a diagram located at the top of the central instrument panel.

Fuel gauge indicate quantity of fuel in the tank to within 1 percent. Any appreciable difference in weight of fuel carried on either side of the aircraft is indicated by a warning light sounding pulse to connect the plane's trim by manual selection of tanks.

► **Hydraulic System.** This operates at a standard pressure of 1500 psi. Control pressure a 2100 lb per square inch, and relief valve pressure is 2700 lb per square inch.

Power is via two constant pressure, variable displacement, magnet driven pump providing discharge at constant pressure. Operated by the main power plant, hydraulic system includes emergency hand pump, over trips, and auxiliary power pumps.

In addition, an electrically driven hydraulic pump is provided for emergencies in the event of main system failure.

► **Anti-Icing.** System—A high capacity alternator mounted on each engine generates supplemental power to the anti-icing system comprising resistors wire embedded in pads attached to the leading edges of outer wing panels, fillet and horizontal stabilizer, together with cycling relay to turn power on and off and synchronizing contacts.

A warning light circuit is installed to indicate improper functioning of the system. The alternator has voltage regulation and temperature protection and has an additional unit, one which in case of failure, operation of the entire eng of the engine speed range under full load. A safety device is also provided on the pad return to prevent damage at ground level.

► **Undercarriage.** Not retractable forward and the nose casts in front of the forward pressure bulkhead, while the main units, housed adjacent to the wing main units, extend forward between the nose and the up position to facilitate the pit stops.

Wheel tires are made to American Tire and Rim Association specifications, including steel tires to be fitted

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How Models Cut F-90 Development Cost

Aircraft-scale test models have played an important role in the design and development of Lockheed's F-90 jet fighter—served in the Air Force fleet.

Although the craft is rated for flight testing at Mach .8, the slant of the day, which originally would have to be gathered in the field, already has been attained with these project models.

For example, dropping the models from altitude have enabled staff of the aircraft's Systems Analysis group to simulate the aircraft's continuously applied though only due to the weight of the aircraft. While cost of making such a test vehicle was high, since it was designed in a single flight, Lockheed engineers estimate that many thousands of dollars were saved with

reduction in amount of testing normally required with the completed plane, not considering the maximization of drag.

Making and application of these scale configurations in the advanced test program are shown in the accompanying photos.

1 Production line for F-90 drop test models, prior to final development of the aircraft. Steerable carts are constructed of steel and plastic and are used to within five thousandths of an inch accuracy.

2 Lockheed engineers use miniature scale model to investigate vibration frequency of F-90's swept wing. All parts of the structure were studied to determine response to vibrations and

buffeting expected at maximum speed.

3 Scale model attached, inverted, to bulk of F-90 to be tested, slant and dropped from 35,000 ft for high speed descent. Flight characteristics were observed via radio tracking. Any radio within model transmitted data between control force and load data.

4 Another scale model is checked in Lockheed's 100-mph tunnel for leading characteristics with gear and flaps extended and with tip tanks installed. Other runs were conducted to study flight characteristics. Other tests were run at Collier's large transonic wind tunnel and in Air Force's Dryden open tunnel.



Plastics Proving

How stepped-up testing is done by National Bureau of Standards.

Increasing use of laminated plastics in aircraft materials or structures and manufactured parts such as bulk heads, partitions, landing gear pylons, wing flaps, and doors has stimulated the need for more comprehensive data on effects of weather, temperature, and humidity on properties of these materials.

To evaluate these plastics and project adequate specifications, the National Bureau of Standards, under sponsorship of the National Advisory Committee for Aeronautics, initiated a study to determine effects of ultraviolet light, accelerated weathering, and accelerated moisture conditions on the strength characteristics and flexural properties of some acrylic plastic and unheated poly ester plastics.

The accelerated weathering tests were subjected to cycles of ultraviolet light and fog while samples still subject to heat consisted of cycles exposure to various temperatures and relative humidities.



"MORE" PROP FOR SAME DIAMETER

New Curtis Electric 15H propeller, with blade aspect ratio of 150 in spanwise 75 in form, made of same diameter, has been approved by Civil Aeronautics Administration for unseparated operations up to L-750 and L-700A Configuration up to 187,000 lb gross. New design embodies more of former blade area shielding propeller disc, particularly for tail-off and climb, and shorter takeoff run. Curved flight with this prop is reported, with hour in place.

***Plastics Studied**—Test materials were commercial products, and included laminated plastics and a unheated, fiber-filled plastic, plastic, type commonly employed in aircraft. These materials were also fiber following the designation, in average thickness in which, around, density in grams/cm³, third, number of plies:

Ciba fiber, unheated polyester, 138, 1.70, 2;
Ciba AA plastic (acetate fabric reinforced), 149, 1.93, 4;
High strength paper plastic, 122, 1.47;
Grade L, phenolic (froth) fabric reinforced, 125, 1.34, 19;
High strength paper, phenolic, 124, 1.44;

Mastacrylic fabric, unheated polyester, 151, 1.27, 7;
Grade C, cotton (cotton fabric, reinforced), 132, 1.36, 7;
Tarnished dark carbon fabric, unheated polyester, 145.1, 1.37, 6.

Laminar paper, 125, 1.38 (unheated) is twice a control in savings of test, because of the known dimensional stability of this type of plastic.

Micromat carbon fabric, phenolic molding compound, 121, 1.17 (specimen was a sheet form prepared from a molding compound, while all other materials were laminated sheet).

***Test Conditions**—Sets of specimens, mounted on racks at an angle of 45 deg facing south were exposed to outdoor weathering on the roof of an NBS building. At the end of two years, weight and dimensions, and several properties were determined on these specimens.

In the accelerated weathering test of alternate exposures to ultraviolet light and early atmosphere, one set of specimens was run under constant weight and dimensions. Was another set, thermal cycling, was determined after exposure to regulated conditions for 124, 242, 360, and 488 hr, respectively.

Set accelerated service tests involved exposure in cycles of temperatures from 70 to 175 F, relative humidity five to 100 percent, and ultra-violet radiation. In each of the tests, weight and dimensions of one set of specimens were measured after 1, 3, 5, 10, and 20 cycles.

The flexural properties were determined on other sets at the end of 3 and 10 cycles.

***Results**—Changes in weight, dimensions, and flexural properties were the criteria used in analyzing the data obtained during the investigation. In none of the tests, changes in weight and plane dimension were negative, any positive change being considered as beneficial. There was small reduction when an increase in flexural strength resulted from accelerated weathering and service conditions. This strength increase was attributed to further annealing of the resins.

Results of laboratory aging tests did not, in all cases, correlate with the results of outdoor weathering, indicating that no single aging procedure for a material may therefore be assumed on the basis of the materials, properties to be determined, and conditions of service.

An accelerated service test consisting of alternate exposure for 24 hr at 175 F and 75 to 100 percent relative humidity, followed by 24 hr at 175 F, and a relative humidity of less than 1 percent, was the same series used in the investigations. All materials, except the unheated, fiber-filled plastic, increased in thickness during the test. Only this material increased in flexural strength and flexural modulus of elasticity on exposure to the accelerated sun test.

Acetate-fiber plastic and glass-fiber unheated polyester laminates were the most resistant of the materials tested. The paper-like phenolic laminate was next in resistance to weight and dimensions after outdoor weathering of the other materials tested. These results indicate that the most resistant laminates are those made with materials which are least affected by water.

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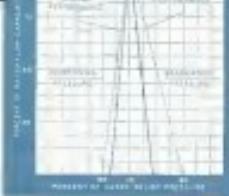


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Fog Preventer Claimed by Inventor

A West Coast company claims to have developed a process which would carry a guarantee to bring about a 50-percent reduction in fog over a 12-month period at any airport.

Known as Hygrophil, the process reportedly has been tested successfully at California's San Jose and Sacramento Municipal Airports. It depends primarily on a "secrecy compensated set test" invented jointly by R. E. Plank, Sr., president of Hygrophil Corp., San Jose, and his son, secretary of the firm.

► Protective.—The process works on the principle of producing "trigger-like" bursts of cold refrigerant points in the atmospheric spray. In this way, the spray's condensation turned to fog. It is said to be most effective when employed as a protective rather than a de-icing measure.

According to Plank, weather conditions at a particular airport and size of the field determine location and number of units needed. Each unit takes a constant air flow of 4 x 4 x 6 ft. housing which can be designed for placing underground or for submerged in waterways.

The company states that, during a three-week test last winter, Hygrophil reduced by 57 percent the number of hours Sacramento Airport was closed to traffic because of fog, compared with an average closed time of the same month in the previous eight years.

► Severe to Weather.—It is suggested that, by coincidence, clear winter just naturally provided more snow normally at the time. Plank says that areas surrounding the fog spot experienced none of the worst fog in years.

To back his claim, the inventor provides figures which show, with Hygrophil installed for two months, average visibility and ceiling at San Jose Air port was 53 percent better than at Moffett Field, only eight miles away.

The firm already has approached the Civil Aeronautics Board to secure a permit to install its equipment at Washington National Airport. It also is attempting to interest the Port of New York Authority in running tests at La Guardia Field.

It has offered to pay costs for installing the equipment if, after six months, Hygrophil does not live up to requirements.

► Non-Patentable.—Plank states the doing nature of his process makes it difficult to patent, while he can secure certain parts of the equipment, he can not patent the principle on which the process is based. For this reason, he says, details of Hygrophil operation cannot be revealed.

THE SPOTLIGHT IS ON

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AIR HORSE: Depicted are details of the double tail on Goring's large helicopter, designed to provide improved directional stability and better control.



APOLLO: Small diameter of Armstrong Siddeley Marsda turboprop (140 hp. each) is shown to good advantage here.



SKEETER: Rotor hub details on Goring's Skeeter II helicopter.



The tiny Skeeter's cockpit is very close and strenuously tested. Good visibility is apparent.

Camera Probes Details of New British Planes

The Society of British Aircraft Constructors' annual show at Farnborough, England, brought out the most interesting British aircraft designs. Realizing

the opportunity for issuing British design progress, AVIATION WEEK assigned its news editor, Robert B. Hora, to-on-the-spot coverage. These exclusive

photos were taken by Frederick A. Brewster, McGraw-Hill's chief correspondent in England, with the advice and assistance of Hora.



METEOR: Ground report on the special Gloster fighter fitted with stabilators (shown in Britain). Installation is neatly fitted.



VISCONTI: Rear engine nacelle on Delti helicopter shows engine mount structure.



HERMES V: Engineers evidently paid a lot of attention to dissipating thermal turbofan cooling, shown here "perfled".



WYVERN: Aviation Week's Bob Hora points to tail fin on Westland fighter.



VENOM: Mechanics have easy access to front of new DH fighter engine, instruments and armament. Thin adult is shown.



METEOR: New tail on Meteor VII fighter to raise initial Mach number on the Gloster.



Nose tail on Meteor IV fighter clearly points up extent of modification made on Meteor VII shown in photo at left.



Buck

Rogers come true

Imagine you are Captain Buck, test pilot. You squeeze into the cockpit of a swept-wing turbojet. You check your instruments, jiggle the controls, signal readiness.

You start down the runway and pick up speed. Suddenly, your plane seems to stand on its tail like a maddest shark and hurtle straight into the sky. Behind you stream two plumes of billowing vapor.

Minutes later, you are in thin air, traveling at the astounding speed of one mile every six seconds!

Fantastic? Not at all!

JATO (jet assisted take-off) is only one of the many amazing developments of modern aviation. In fact, every art and science known to man is applied in modern aviation.

More than any other industry, aviation reaches into the future. That's why, today, it is a golden opportunity for manufacturers.

Right now, in its vital new program of expansion and development, the aviation industry is spending almost ten million dollars a day!

No matter what you make or sell, aviation offers a vast new field of opportunities for you. The sky is the limit for those who act now!

For a detailed outline of the market potential of your products in aviation, write for "Aviation Week—and the Market It Serves." Aviation Week, Dept. A, New York.

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St. Louis, Dallas, Atlanta, San Francisco and Los Angeles.

Look to the Sky
for your market



NEW AVIATION PRODUCTS



capable of continuous, heavy-duty operation.

Weighting only 65 lb, this motor-driven box has 1-in. maximum stroke and 4-in. hole-to-hole. Approximate speed with 1-hp, 1775-rpm motor is 250 strokes per min. Unit has positive single trap safety mechanism used in 4-in. model produced by company. Box can be made to repeat simply by removing one screw. Bias device is glued for wear adjustment and can move given 1-in. adjustment.

Box consists of 2-in. side plates, an replaceable base, bushings and is equipped with sliding key catch and 20-lb, 9-in. hydraulic pump.

Conduit Assembly Aid
For holding fixtures to flexible conduit, special bush base, offered by Dent Mfg Co, Compton St, N. Hollywood, Calif., is designed to meet requirements of rapid production assembly.

Based on principle of preventing heat or conduct instead of applying it externally, device's operation is aimed to provide cold joints, speed up production, reduce solder consumption and cut down number of required parts.

Movable supporting post holds conduct between sprung-loaded clamps. Movable end of the electrode posts are hinged to permit hot leading and withdrawal of parts. Solder control for electrode is controlled by switch on top of fixture or by saw looking hot switch, operator has both hands free for handling work and applying solder.



High-Amp. Breakers

Arrest current breakers, having current ratings up to 650 amp, are 200-c.c. models and 250 amp for 170-c.c. models and offered by General Electric Co, Schenectady, N. Y. Breaking ratings for these devices are 12,000 and 10,000 amp respectively.

Breakers are recommended to withstand efficient operation up to 2000 ft altitude. They are designed with long-time delay reverse current trip mechanism for use in parallel circuits, and with directional or non-directional trippers for other applications. Electrically and mechanically closed units have bimetal curtailments, with former incorporating anti-pump control arrangement. Flag-type indicators, behind thermostat window, show when manually closed and unit is tripped. Flexible rubber boot covers closing lever.

Both moving and stationary contact tips are made of an investment alloy

bright carbide material to give longer life and freedom from welding. Units are not to be applicable for bus rebooster, and low voltage as dual radio distributing and dual circuit



Aircraft Antenna

A-11 VHF omnidirectional antenna, made by Aerotech Radio Corp, Roseland, N. J., is designed for reception of course range and runway locator navigation signals. Approved under CAA certificate No. 184-6, and covers 105-122 mc band with less than 10% voltage standing wave ratio of less than 2.5 into 50-ohm coaxial line. Mounting is interchangeable with AS-27A-CAR-1. Antenna comes with ARC Type 150 connecting equipment or can be supplied separately.

Phenolic Laminate

Grade LSP phenolic laminate with marbled, uncoated cotton fiber, developed by Syntex Corp, Costa Mesa, Calif., is recommended to have high impact fatigue factor and superior insulating qualities without sacrifice in electrical or chemical values.

Material is said to have more evenly spaced products fibrous fibers from conventional woven fibrous plastic laminates, because carbon fibers of vinyl ester are more distributed and lay in all directions, rather than as parallel planes in woven fibers.

Company claims average ether fuel usage is 10% lower than conventional styling of Grade LIP, second National Electrical Manufacturers Assoc. average for Grade L and Grade C products. Grade LIP is stated to show greatest appearance at higher impact temperatures, as follows: impact temperatures at 1/8 in. at rate of 40 ft/lb/sec., Grade LIP is reported to have residual 3000 impacts at ambient 50° F. for Grade L and 100 ft-lbs for Grade C.

Material comes in 16-in. x 4-in. x 1/8-in. long bars, 16-in. x 4-in. x 1/4-in. diameters, and is sold in tubing with 3-in. or minimum 1-in. and 4-in. minimum 1/2-in. walls from 3-in. dia.

Rocker Box Gasket

Gasket material having silicone rubber coating on weaves Fiberglas cloth has been developed by Armacell Products Co, New Bedford, Mass., for sealing between aircraft engine piston boost and cover. Product also is claimed to have many advantages in industrial applications where strength, minimum weight and thickness, and resistance to oil and extreme temperatures are important requirements.

Recommended in costly ultra-light temperature up to 500° F., material currently is furnished in thicknesses varying from 0.03-0.08 in. Fiberglas cloth without coating weighs 6 oz/in.²/in. and has maximum breaking strength of 250 psi on the warp and 300 psi on the fill.



British Fire Truck

Aircraft fire fighting trailer with VHF two-way radio-telephone, developed by Pyrene Co Ltd, Bracknell, Middlesex, England, is designed to provide heavy discharge of foam, CO₂ gas or water.

Trailer is capable of pumping foam at 2500 gpm. Already ordered by Ministry of Civil Aviation for 18 British civil airports, trailer is capable of pumping foam at 2500 gpm. Radio telephone, 10 m. and intercom system. MCA trailer was invented on Avro Arrow Co chassis, but Pyrene states it has developed improved unit using Thermoflex (Nylon 6/ACM) chassis (above). This model has 55 hp, 4-cylinder engine and four-wheel drive.

Pyrene-Thermoflex trailer carries 500-gal water tank, 40 gal. foam-making tank, reinforced water pump delivering 400 gpm at 150 psi, 2-meshed, 125-gal. foam generator, 100-ft. 4-in. diameter hose for car washing operations and foam discharge nozzle 90-30-899 CO₂ bottles, two CO₂ heat sinks, each containing 100 ft. 4-in. hose with discharge valve.

Enough foam expandant is provided for 3000 gal. of water. Extra water hose external source can be brought through passageway section inlet. There is large compartment for 55-in. crew, and 4 doors, two of sliding type.

Boeing Selects

WHITTAKER
SHUT-OFF VALVES

for new B-47
Stratofjet

Zestone cuts the sky,
the new Boeing B-47.

Stratofjet with six powerful jet engines and machinery rocket units is one of the world's fastest bombers. It can take off and climb at almost incredible speed. It can carry 20,000 pounds of bombs. And it flies better than any other airplane. Only after maintaining aircraft, the new B-47 is stripped with Whittaker valves. These valves open and close all valves on the wind feed and primary compressed air take-off system. Whenever the valves fail ... whenever dependency is must . . . you will find WHITTAKER valves. WHITTAKER's valuable engineering staff stands ready to assist you on your aircraft valve problems. Write Engineering Sales Dept., Wm. R. Whittaker Co., Inc., 103 North Olympic Avenue, Los Angeles 38, California.

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Whittaker

Fast
in design

Fast
in performance

Fast — in valves that are first choice in design

Midget Punch Press

For small punch press jobs now being performed on workbenches of greater tonnage than actually necessary, Beachmaster Mfg Co, 1552 W. Pico Blvd., Los Angeles, Calif., offers "Midget" punch press having 1 ton capacity and

PRODUCTION

Aircraft Industry Backlog Record

(In millions of dollars)

	For Quarter Ending					
	June 30 1948	Sept 30 1948	Dec 31 1948	Mar 31 1949	June 30 1949	
Aircraft and parts						
Military	\$2,133	\$2,082	\$1,962	\$3,865	\$1,795	
Civil	187	145	132	124	129	
Engines and parts						
Military	869	772	783	746	631	
Civil	24	26	27	35	37	
Propellers and parts						
Military	105	102	96	98	105	
Civil	11	10	7	5	5	
Other products and services	88	99	121	113	100	
Total	\$3,212	\$3,216	\$3,165	\$3,999	\$2,881	
Source: Common Data						

Midyear Position Promising

Backlog declines slightly, even though new orders increase, while sales and profits are climbing.

Backlog of orders for the aircraft industry stood at \$2,881 million at midyear 1949, a good 4 percent decrease from the \$3,212 million reported May 31, 1949, according to the Census Bureau.

The figure includes orders for aircraft, engine and propeller companies, and breaks them this way:

- Aircraft and parts—Military, \$1,795 million, up 15 percent.

- Engines and parts—Military, \$112 million, up 517 million.

- Propellers and parts—Military, \$306 million, up 35 million.

- Other products and services—\$350 million.

Individual aircraft manufacturers reported the following figures in a separate *Aerospace Week* survey:

Beech Aircraft Corp.—Unfilled orders as of June 30 were \$10,371,467, of which \$5,200,412 was backlog and \$4,177,016 was unexecuted. First six months sales totalled \$9,614,551, and net profit was \$1,151,577.

Bell Aircraft Corp.—Unfilled orders was not available, but net profit for the quarter ended June 30 was \$82,672, compared with a first quarter net profit of \$39,660. Sales and other earnings at midyear were \$5,424,995.

Boeing Airplane Co.—Backlog at midyear was \$15,078,293, after eliminating

nearly 385 orders because of cancellations of the Air Force B-54 contract.

Sales for that period amounted to \$10,021,821,152, principally B-54s to the military and B-52s to civilians. Company reported a net profit of \$662,349 for this period.

Consolidated Vultee Aircraft Corp.—Unfilled work under unfilled orders totalled \$3,040,473,183 at June 30, of which \$1,733,877,996 was remaining and \$2,299,600 was unexecuted. Net sales for the six months ending May 31 totalled \$10,419,532,193 and net profit for the period was \$1,505,157.

Douglas Aircraft Co.—Backlog on July 1 was \$10,601,452, of which 95.2 percent was military orders and 1.6 percent commercial business. Sales for the first six months were \$5,122,936, and net profit, after taxes and other provisions, was \$2,575,741.

Gates-Corteco Aircraft Engineering Corp.—Backlog figure was not available, but profit before tax totalled \$2,412,734 for first half 1949. Net profit, after taxes and other provisions, was \$1,000,000. First six months sales were \$1,000,000.

Lockheed Aircraft Corp.—Backlog at midyear was \$5,012,268,000, of which \$4,714,000 was commercial, \$511,162,000 was for Air Force, and \$77,642,000 was for Navy. Domestic and international orders for additional Con-

stellations stand at 10 percent of new military orders in backlog for the year.

At the same time, backlog for the year ago was \$5,018,000,000, and domestic and international orders for additional Constellations stand at 10 percent of new military orders in backlog for the year.

McDonnell Aircraft Corp.—Backlog as of June 30 was \$62,896,841.

North American Aviation, Inc.—Unfilled orders at midyear were \$2,128,022,667, compared with \$16,638,669,493 a year ago. During the third quarter ended June 30, company had backlog of \$7,120,000, up 1,000 units, and made domestic backlog of new aircraft of \$1,000,000. Net income during first quarter was \$5,182,186. Sales and other income for the same period ending June 30 were \$871,558.

Rockwell Aviation Corp.—Backlog on July 1 was \$6,708,000, all of which is in military orders. Net income after taxes was \$1,673,585, while sales for the six months period totalled \$17,779,582.

United Aircraft Corp.—Backlog as of May 31 was \$330 million, of which 85 percent was in military contracts. Total backlog as of June 30 was \$72,229,228. Net income, after taxes, was \$1,766,531.

In the current six-month period, total new orders received by the company during the quarter ending June 30 totalled \$337 million, compared with \$320 million in net new orders received during the first quarter.

Buildups of new orders

- Aviation and parts—Military, \$157 million, civil, \$17 million.

- Engines and parts—Military, \$11 million, civil, \$11 million.

- Propellers and parts—Military, \$23 million, civil, \$1 million.

- Other products and services—\$71 million.

Industry net sales during the quarter ended June 30 were \$429 million, compared with \$388 million for the previous quarter. Aircraft and parts accounted for \$174 million, engines and parts \$70 million, propellers and parts \$11 million, other products and services \$56 million.

PRODUCTION BRIEFING

Boeing Airplane Co., Seattle—An addition to its military production contract is working on selected projects for the Army Ordnance and Contract Accountant Laboratories.

National Aerospace Corp.—has increased employment and work practice by more than 50 percent in order to reduce its backlog of orders for missile equipment.

LATEST AIR FORCE BID AWARDS

As Mutual Contractual procurement, DDCI makes available to Aviation Week the latest bid awards, shown on this page. Bids are listed in chronological order, addressed to Contracting Officer, AMG, Wright-Patterson AFB, Dayton, Ohio, or reference 3450V301.

AWARD HISTORY

For 600 plane fighters—McDonnell Aircraft Corp., St. Louis, Mo., a subcontractor of Hiller, Inc., has been awarded a \$1,000,000 contract on a lot of 100 F-86A's. D. McDonnell & Sons, Inc., of St. Louis, Mo., has a subcontract of \$100,000, and Standard Aircraft Co., Inc., of St. Louis, Mo., has a subcontract of \$200,000.

For 600 planes—McDonnell Aircraft Corp., St. Louis, Mo., a subcontractor of Hiller, Inc., has a subcontract of \$100,000, and Standard Aircraft Co., Inc., of St. Louis, Mo., has a subcontract of \$200,000.

For 600 bombers—McDonnell Aircraft Corp., St. Louis, Mo., a subcontractor of Hiller, Inc., has a subcontract of \$100,000, and Standard Aircraft Co., Inc., of St. Louis, Mo., has a subcontract of \$200,000.

For 600 transports—McDonnell Aircraft Corp., St. Louis, Mo., a subcontractor of Hiller, Inc., has a subcontract of \$100,000, and Standard Aircraft Co., Inc., of St. Louis, Mo., has a subcontract of \$200,000.

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For 600 transports air components—\$10,220,411—Chicago Pneumatic Tool Co., Detroit, Mich., a subcontractor of Hiller, Inc., has a subcontract of \$10,220,411.

For 600 gunships—Dynamit Nobel, Inc., of New York, a subcontractor of Hiller, Inc., has a subcontract of \$10,220,411.

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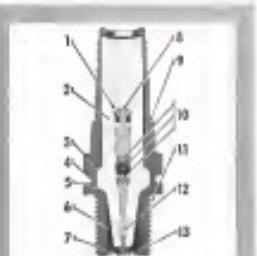
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For 600 gunships—Dynamit Nobel, Inc., of New York, a subcontractor of Hiller, Inc., has a subcontract of \$1

Reduces off-schedule plug changes



- 1 Core coated on
- 2 Porcelain insulation
- 3 Extended Contact
- 4 Heat-treated, tungsten assembly
- 5 Nickel jacket
- 6 Insulation sleeve for electrodes lead electrode
- 7 Platinum center electrode tip 450° incl.
- 8 Lead core pin
- 9 Brass lead-pass construction with silver plated contacts
- 10 Electrical strength
- 11 Ceramic glass coating on lead. Glass graphite coating used, helping electrode wear. Copper-graphite coating on lead
- 12 Silver, oxidatively cast to insure good heat conducting contact with electrodes
- 13 One of two large 30° square platinum ground electrodes

Air lines report that the AC-181 Spark Plug produces an important reduction in off-schedule plug change costs. Back of these reports is sufficient flying time to make it very certain that this longer life is no mere happenstance. Yet, significant as it is, this is only one of the outstanding features of the AC-181 which, combined, have won it Pratt & Whitney and C.A.A. approval on five P & W engines.

Check over the construction features illustrated. They are duplicated in no other aircraft plug.



AC Plugs for jet engines have also participated in the establishment of many speed records.



OTHER AC AIRCRAFT PRODUCTS

AC makes many aircraft products off its AC-181 highest quality standards.

**DAKOTAFLITE • THERMATIC GAUGES • AMMETERS
PRESSURE SWITCHES • FUEL GAUGES • OIL GAUGES
FUSE CABLE • FUEL PUMPS**

AC SPARK PLUG DIVISION • KIRKLAND, WASHINGTON • 206-282-1100

SALES & SERVICE

Private Pilots

C.A.R. amendment to liberalize use of small planes for business.

An amendment to the Civil Aviation Regulation aimed at clarifying and liberalizing restrictions against use of aircraft by private pilots for business travel will be introduced by the Bureau of Safety Regulation for approval by the Civil Aerobatics Board.

The proposed amendment would revise (simplify) C.A.R. Section 45.60 which, according to the Bureau, has been difficult to interpret and has unduly restricted operations of private

Business Meaning-Sought-The Bureau wants not only to change the wording of the old rule to eliminate confusion, but to "liberalize privilege" of this group.

Section 45.60 currently states that a "private pilot shall not pilot aircraft for him . . ." This is followed by an explanatory note-out-of-the-coldhouse—saying the regulation "permits that the expense of a flight or piloting aircraft is a business if a business when the flight is made solely for the personal transportation of the pilot."

The Bureau had asked redefined

persons to submit their views on the new proposal by September 27.

As presently written, the new amendment reads: A private pilot shall not pilot aircraft for compensation or hire, or in connection with any business or employment, unless the flight is merely incidental thereto and does not involve the carriage of persons or property for compensation or hire.

CAR Proposes—The Bureau gives the following interpretation in showing the proposed rule would apply to the private pilot:

• He may still retain operating expenses incurred during flight—one or more passengers may participate.
• As a salesman, he may fly aircraft in the course of his employment, since the flight would be incidental to his business of selling. Examples of such channels also could be carried.

• He may fly his own airplane at business to meet another officer of firm and see his friends or other employees provided there is no charge.

• He may stop down at his own land, but not the land of another if he does so for compensation or hire.

• He may fly around when the flight is not for compensation or hire.

• As a real estate operator, he may fly his propeller plane to land offices for sale.

• He cannot demonstrate aircraft in flight to customers, as an employee et al.

or otherwise for the account of, a passenger or company engaged in the business of selling aircraft. In this case, the documentation of aircraft is not necessarily limited to the employment or business of the pilot, but is integral part of the business of selling.

Mail Ads Boost Used Plane Sales

Pine Mart, the recently established new department of Pacific Aircraft Sales Co., with operations at Lakewood Air Terminal, Burbank, Calif., and Oldland Airport, uses a direct mail advertising program which has achieved sales results in about four times as great as those anticipated.

Norman Larson and Fred Alphonso, owners of PASC, set up the new organization to act as a broker for used plane sales, on a buying and resale program and make a used air business. Early this year their new program has brought into their office an average of six bona fide airplane prospects plus other inquiries by mail and telephone.

Query Plane Owners—A 7,000 issue mailing lot of persons known to us to have owned an airplane within the past three years was used to make the first announcement of Pine Mart which received a self-mailer questionnaire which asked them to fill out in great detail who they sold planes, what he had paid, etc., and to beg.

"When you were to sell," said a letter which was part of the questionnaire, "the Pine Mart will accept your airplane as an arrangement either at Chalk Hill or Burbank. The airplane will be displayed prominently. It will be advertised in trade journals and by direct mail bulletins. Work by and coordination with each other will assure us all AC planes are stored in preflighted, painted, special dry-down units."

Subsequent meetings with planes available via a brochure "Spars don't eat like living meat" of the excellent used plane we have for sale. Write us your requirements.

Larson and Alphonso, who have been operating PASC since 1957—a long time for a continuous operation in the aviation business—say watching their original mailing list grow at new proportions are added.

Plan Follow-Up—They plan to send out a questionnaire twice a year, and send a list of the planes currently available for sale at Oldland and Burbank in times a year.

They believe the used plane sales department is a necessary adjunct to a complete airplane distributor's business, and look at it to suggest considerable the sales volume which they now have at their distribution in California and Nevada.



LIGHTPLANE GAS STATION

Globe Swift is "proud" of lightplane fueling design since small craft Circular-type tanks prevent one tank from pushing another out of its tank or causing damage. Located by aviation division of Standard Oil Co. of California, it is located in Napa County Airport near San Francisco Bay.

FINANCIAL

Manufacturers' Profits Fluctuating

Postwar transition period supposedly now is past, but operations still have not shaken down to normal.

Conflicting trends are presented in the periodic reports currently being issued by leading aircraft builders.

Nevertheless, more than four years after the end of the shooting war, stability of operations is lacking among the industry's 12 whole.

► **Boeing**—Case History—Even at those extremes where huge backlog exists, it takes day-to-day analysis of several profitability and earnings. The experience of Boeing Airplane Co. illustrates a number of the peculiar problems facing the industry in a peace-time economy.

At 1945 year-end, Boeing's backlog aggregated more than \$341 million. Obviously, this was not due to failure in the market; rather, it was due to the war. In fact, backlog ended June 30, 1945, at total sales of \$150,000,000, a net profit of only \$667,344 was realized.

In other words, a net profit equivalent only 0.43% of 1 percent perched. The aircraft industry, as a whole, showed a profit margin of 4 percent in 1947 and 14 percent during 1948. The average for all general manufacturing enterprises in the United States is around 7.5 percent, with 10 to 11 percent in 1948 uncommon.

An analysis of Boeing's low rate of profitability leads to no conclusion. Stated briefly, the company's net sales increased in 1948 amounts to a change of \$2.2 million, or an increase to total net of \$10.5 million, an increase of 20.5 percent. The company's net earnings increased by \$1.1 million, or an increase of 14.4 percent. The upshot is that the remaining loss of \$3.3 million would be repeated against 1947 results. Such did not prove to be the case.

In the first six months, another \$5.9 million in the Statesman program was written off, bringing total charges to \$31.1 million. Thus, in addition to the \$5.3 million already in a further potential loss, another \$3.6 million has been added.

But that is not all. The company declares that the estimated total loss on the Statesman project is now expected to reach \$34 million. In other words, at least another \$2.5 million in charges remains to be charged to operations from the seven months during the second half of 1949.

► **Less Unexpected**—When the States-

man program was first launched in 1945, Boeing was expected to realize a profit on the project. First orders for 55 planes were received from Australia, Canada and New Zealand. Deliveries were expected to start in 1947, but severe inflation and congressional tests delayed the project. A major strike at the Seattle plant last year further postponed delivery schedules.

Nevertheless, the company's loss in its Statesman program is running in the light of the strong salvagings applied. For example, Boeing carried substantial deposits and progress payments in its transport plane, but these positive provisions, such as escrow clauses, were interpreted as contracts.

Boeing reasons with a sensible order backlog despite the \$35 million cancellation of the B-54 project. At June 30, 1948, unfilled orders were listed at more than \$155 million, nearly 50 percent.

► **Curtiss-Wright Aircraft Corp.** is also having difficulty reaching a plateau of satisfactory earnings. For the quarter ended June 30, 1948, the company showed consolidated net income of \$2,450,000. This compares with \$2,493,000 for the like period a year ago. For the first half of 1948, net income aggregated \$4,393,431, compared with \$5,753,711 for the same period in 1946. Some 10 percent of the decline, however, came between \$511,600 to less than \$557,000 for each quarter.

► **Kirkpatrik**—A sharp reduction in earnings is evident for Republic Aviation Corp. For the six months ended June 30, 1948, the company disclosed a net profit of \$12,581 on total sales of \$17,779,162. The comparable period of 1947 showed a net of \$1,352,653.

Republic's 1949 earnings exclude \$321,530 re-charterization claims, orders still pending and contract deliveries in prior years. A partial offset to these items is the provision of \$12,600 taken from current earnings and credited to a reserve for contingencies provision. Adjusted, net earnings for the first six months of 1949 would appear to be, much closer to \$10,000,000 than \$17,581, as reported.

Interest reports of the aircraft companies are most helpful in supplying a lead of preceding optimism. It is frequently misleading, however, to accept net earnings as definite figures of their true value without some inquiry as regards of adjustments that may surround such reports. —Sieg Albrecht



Scandiaair Airline Systems Inc.

PHOTO BY LUCILLE R. HARRIS FOR AVIATION WEEK



August 21, 1948

Searle Pharmaceuticals Corporation,
2025 East Kenilworth,
Chicago 16, Illinois

ATTENTION: Mr. James H. Murphy,
Sales Manager.

In 1948 Searle jet-dry aircraft were delivered to the Scandinavian Airlines System.

The new aircraft feature airconditioning systems so cool as to be described as "airconditioned aircraft" because they are cooled by refrigeration instead of air. The aircraft are used in vital regions where temperatures often exceed 100° F.

The aircraft of the Scandinavian Airlines System are flying to 47 countries in five continents including Africa and Australia. The aircraft, which are built by the Douglas Aircraft Company, are high-wing monoplanes, one of the most advanced types of aircraft in the world. They are used in the Arctic, in Europe, in Asia, in Africa, in Australia, in South America, in Central America, and in the Americas.

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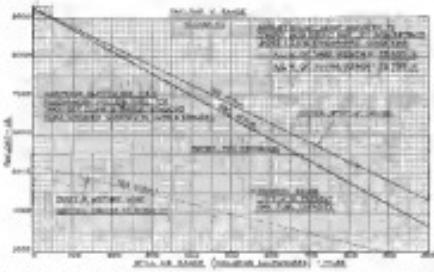
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AIR TRANSPORT



INACHNEA THOMASII EDC. It is a species of flowering plant in the family Poaceae.



PATENTED AND SP-221 over the pulsing engine 100-5, which must be replaced by two

British Offer Turboprop DC-3

Armstrong Siddeley plans international sales effort aimed at taking part of U. S. market from Super DC-3.

Dr. Robert Blas

RUGBY, ENGLAND—First meeting of a British turboprop engine with an American aircraft was displayed at Bitterwell aerodrome over here last week by Armstrong Siddeley Motors Ltd before extremely interested groups of British and foreign aeronautical engineers.

and U.S. military officials.

DC-3 software to develop accurate flight test data on the operational and economic differences between piston and turbogenerator power plants. The DC-3 was subsequently referred to for the annual experiment because of its success as a portable, reliable software.

► Plan India Deira—Although the govt. has engaged people as a research pilot with Ministry of Supply support, Armstrong Seddley is so pleased with the revised data obtained that it plans an extensive international sales campaign.



ENGINE ACCESSIBILITY is limited in the Minx 100.

ENHANCE TAB B/P is potassium can be released in breath.

are faced with a drastic reduction in payload for their planes by 1953 as in order to meet the new ICAO performance regulations. According to Anstrum, however, the Martin-powered DC-3 will meet the new regulations with a payload reduction of only 1300 lb below the present 20,000 lb in case maximum gross equipped with a set of 4400 hp engines compared with the 1200 hp Pratt & Whitney Twin Wasp piston engines now used.

Douglas Competition—In among the general DC-3 operators based by the 1941 ICAO airworthiness standards will enter stiff competition also the Douglas Super DC-3 program also aimed at converting the present DC-3 aircraft to meet ICAO requirements. Armstrong-Siddeley can assure that price of two Standard plane will be \$100,000, as the DC-3 aircraft will be stiff under \$100,000 and require about 18 days. Douglas quota in Super DC-3 conversions at least \$10,000,000 to \$20,000,000.

Douglas plans to use the Wright R-1820 piston engine which has a take off rating of 1475 hp, only 17 hp higher than the present Merlin rating. For cruising, the Merlin would provide more power since it operates with slightly below its maximum while the Merlin engines normally cruise at between 50 and 60 percent of maximum power.

The Morita commandant insisted the structural damages outside the gas can were negligible. The Douglas engineers had been asked to evaluate the damage, so we were content and left the site. At the end of the flight day, under new IACD requirements, the Twin Wasp DC-3 would score 21,000. In the Manila DC-5, 21,700; and the Soviet DC-3, 23,000. The detailed components of the plane Twin Was scored IACD-3 with the Manila II version under the new IACD requirements via the ad possible table. The Scores were prepared by Armstrong-Siddeley.

Mamba vs. Twin Wasp DC-3

Under new ICAO single-engine takeoff requirements, including distance for landing, takeoff, climb to review height and stacking for one hour, the estimated composite performance at the stated ideal weight would be:

Taref weight Two-Seat Dako, 21,000 lb Minus Dako 26,700 lb		Period B		NOMAD II	
		At 18,000 ft at 15,000 ft		At 11,000 ft	
TWIN WASP	265 mph	219 mph	187 mph	215 mph	
at 15,000 ft	Optimum max. climb	(optimum)	Japanair max. climb	Japanair max. climb	
175 mph		(6800 ft)	(6800 ft)	(6800 ft)	
4,700	6,250	5,150	4,150	4,850	
4,200	7,300	7,400	7,500	7,100	
3,780	6,300	4,300	4,150	4,150	
3,650	5,700	3,150	3,500	3,700	
3,200	5,300		3,300	3,200	
Using fuel tankage of the aircraft limits the maximum attainable range as follows:					
at constant at 18,000 ft	(140 sec 130 mi) with 1150 lb payload				
at 16,000 ft	(3000 ft) At 165 mph 823 mi Web				
at 14,000 ft	(3000 ft) At 165 mph 823 mi payload				
at 12,000 ft	(3000 ft) At 165 mph 823 mi				
					1200 lb

Gen Carl Spaatz, chief of USAF

that passed all necessary.

The Navion II weighs 1600 lb unladen with 5400 lb for the Twin Wasp and about 1400 lb for the Wright 1620 to be used in the Super Bimotor. They indicated that

If ought to particularly concern the probabilities of a DC-10 crash in the rear fuselage caused at high altitude by decompression during flight, and because of the fact that at the earliest the C-141 fleet B-5 Navy group also impacted the fuselage DC-3. The Navy faces a serious problem no matter if it's R&D (such as DC-11) transports which are now operating.

Inviting Soldiers' belief can
be argued, who are employed
at levels of 500 miles or less, will be
particularly interested in the Module
3 since it will enable them to com-
ply with the new requirements with
which is now on an extensive scale
basis.



The newest member of the Lockheed Constellation family is the Union of South Africa. This government recently purchased a fleet of these 500-mile-an-hour transports for the South African Airways. Now, four members of the great Commonwealth of Nations fly the majestic Constellation.

Australia is represented by Qantas Empire Airways; India by Air India International and the United Kingdom by the British Overseas Airways Corp., all flying the Constellation. Eight other major world air routes also fly, and many have requested this famous red and green Arthur, still the world's most modern four-engined transport.

AMERICAN AIRLINES FOR EXPORT

Lockheed Constellation

LOCKHEED AIRCRAFT CORPORATION, BURBANK, CALIF.



AVIATION WEEK, October 3, 1949

affecting the thrust line. Propeller rotation has been moved forward for CG reasons, bringing the blades opposite the engine. This will be changed in later construction to conform with IACO requirements.

Maintenance character of the Twin. Many studies have been pursued in the area of maintenance and repair, although the Marlin design is inherently smaller. However, some dimension reduction has been obtained through better flow over the turned surface and elimination of cooling ducts. Cooling air is on the nozzle side and has been replaced by a streamlined duct for the returned mass which Saab Avanair Ltd., Douglas agent in Britain, mentioned on the convention.

►Exhaust System.—The exhaust system is carried up over the top of the wing spar to go around the even when flat and emerging sheet metal along the chord of the upper side of the wing. It is built up from 1/2-inch plate, and this foot, Armstrong-Siddeley feels it can reduce the length of the tail pipe without any difficulty. There has been no sign yet of any deterioration of follow-on control surfaces on radar and elevators as of wider service hours from the jet exhaust.

The main cooling intakes are located on each side of the Marlin nacelle. One is for oil cooling and the other is used for external cooling of the nacelle. Although internal radiators now penetrate back 90 degrees, it is possible to touch the outside of the exhaust pipe with your hand. Accessories located further aft than those on the propeller aircraft. The Marlin uses either a compressed air or electric motor and can operate on either because of 100-ampere service gear.

►Central Shipload.—The second U.S. twinjet is designed, Preston declared. His said economy measures will call for country-by-country arrangement of certain rate structures but expressed confidence no owner would be so short-sighted as to take individual advantage of the situation.

►Rate Vary—Seat distribution in the North Atlantic rate structure followed immediately after the 1948 30 percent devaluation of the British pound. U.S. operators cited that London-New York air fares about 50 pounds when converted to \$550 before devaluation to 175 pounds, the new equivalent of \$350. At 200 percent, Orientair Corp. continued to charge \$6 per pound seat fare (now about \$340) for the continental routes—then undercutting its U.S. competitor sharply.

IATA members immediately met in London to work out the difficulties. It was decided that present dollar rates should continue over the North Atlantic.

Thus passengers buying a London-New York airline ticket will have to

pay expects to develop 1,900 hp, out of the present Marlin with same no-change of the rest of the turbine now under way. An even more powerful version—the Marlin III—is under development but no power estimates are available at yet.

The Marlin is expected to begin its commercial life with an overload period of 250 hours, with an increase to 300 within a year.

At present, drawing is handled by hand-held turbine exhaust gas heat, the front of the engine hot plenum air being vented out for continual regeneration to provide degree of incandescence in addition to the thermal damage of the exposed engine sections.

►Power Test.—The Marlin has passed its 150-hour military and civil type test and has about 300 hours of test and running with over 100 hours flight time in the Apollo aircraft, Marlin's test aircraft, and the Alouette and Bellied military trainers. The Marlin also completed a 500-hour endurance run according to original schedule with only 15 hours of maintenance during the test.

Devaluation

Westbound trans-Atlantic
air fares adjusted to dollar rates.

Recent effect of foreign currency devaluation on overseas air travel will be beneficial, in the opinion of Wm. L. Brown, TWA board chairman and senior year president of the International Air Transport Assn.

Devaluation will encourage American tourists to travel abroad, but the U.S. tourist's dollar is increased, Preston declared. His said economy measures will call for country-by-country arrangement of certain rate structures but expressed confidence no owner would be so short-sighted as to take individual advantage of the situation.

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over 125 dissolved British pounds or \$100. Smaller rate lists over the North Atlantic were proposed for other de-escalated currencies.

► **Dollar Fares Cut**—But IATA agreed to recompute rates in terms of British pound sterling within the trading area. Thus, dollarizing passenger flying within Europe, in the Middle East, Asia, Africa and Australia will benefit from 15 per cent fare cuts.

The rate cut will continue at least until IATA's North Atlantic tariffs can become effective in Mexico City early in November.

► **Mail Taxis**—Strohfeldt-Vloedwijk, manager of newly established DC-4 worldwide operations, informed of a temporary strike at IATA's recently-considered 50th anniversary meeting in The Hague. A traffic committee study

ing the subject reported the reduction would be unnecessary.

Later, however, IATA decided that fare differentials may be unavoidable in some areas for short and after-war periods. Regional traffic conferences were advised to study how best in a series of leveling off will resolve variations in traffic flows. It was also agreed that in future rate changes should be adopted with less than minimum caution.

Paul American Airlines president James Eppie expressed belief that IATA members have learned enough time and to develop the rate war against Northwest Airlines' previous Credit Charter so would strong support future rates.

Next year, IATA's annual meeting will be held in the U.S.

Putnam Says Go Slow on Coach

Declares low fare flight would lose 20-cents-a-mile compared to flight at regular fare.

Confidential auditors should experiment in the air coach field with enforcement of the opinion of Chicago and Southern Air Lines board chairman Clinton Putnam.

Commenting on a speech made recently by Sen. Edwin Johnson (D., Calif.), Putnam challenged representation that the scheduled carriers have been successful in offering more coach service. Information that irregular carriers have shown large gains in passenger traffic indicates operations are unprofitable, Putnam wrote the Senate Interstate and Foreign Commerce Committee chairman.

► **Assess Another**—Here's how Putnam wants you to look at coach:

"A 10-passenger plane operating at 60 percent load factor at the maximum fare and taxes in fiscal 1960 at the regular coach-mile fare will take in \$3.83 a mile. The same plane operated at 90 percent capacity at the 4-cent-a-mile air coach rate will take in \$1.93."

"This is probably a reasonable sum percents between load factors and jet fares on regular and coach services, with the coach operation taken at its best. The result is a comparative loss of 20-cents-a-mile in coach except insofar as costs are reduced by omission of meals and other services. These added items probably would not exceed 7 cents-a-mile."

► **Other Note**—Putnam's analysis, of course, would overlook the fact that CAB requires reclassification of regular air transport service to non-regional of AM 10. Thus Fort Worth-Dallas to Okla. City and with single-engine Beech Bonanza. The first had included some

► **Poor Business**—Companysouth, N.W.A. has lost 20-cent rate such as 60 per cent of its coach passengers. Unless there is more compensation than loss in the marketplace, poor business is Northwest's part. Putnam cited John Ryan, whom characterize it investigating similar figures.

(A recent CAB study showed that not 60 percent but less than 35 percent of Northwest's coach passengers would have used regular fare planes if the airline service had been unavailable.) Putnam concluded that those regional flights offered in areas where it could otherwise be able supplemental services are therefore provided a general breakdown of the rate structure down and about.

But in regard coach services as a practice for the industry's base troubles is concerned," Putnam said.

Rates in total world payment for U.S. domestic and international carriers from \$42,867,000 in 1946 to \$49,656,000 in 1957. \$111,521,000 in 1948, and an estimated \$135 million in 1949 covers remaining imprecisions, according to Putnam. He said the reason for the increase was that CAB has been behind in its rate case, and the 1945 legislation intended only general price increases by the government not at all.

► **Melt Off Budgets**—One cannot fully tell the picture of continuing up or over due actions in increase in mail pay or an increase in dependence on passenger. Actually, mail pay of the surface per ton mile of road mail has shown a steadily declining trend in the five or seven prior years.



CENTRAL STARTS TO CARRY THE MAIL

Although work began on the first day of October, Central Airlines' new air transport service to non-regional of AM 10. Thus Fort Worth-Dallas to Okla. City with its single-engine Beech Bonanza. The first had included some

Putnam again attacked the proposed separation of revenue and rates from "airbody" rates and said little to a few potential passengers attached to other lines to those that can run at an argument to take over "unconventional" competition. Such action this would have a full day striking appropriate ticket directly for airline robbery.

► **Tiger's First**—Tiger includes 13 passenger-air C-46s, five C-46s and three C-45s. Total freight-carrying capacity is 75,000 lb.

► **Israeli Asks Permit**

An Israeli carrier has filed CAB permission to start airline service between the Middle East and New York.

EAI-Air Israel National Airlines Co., Ltd., with headquarters at Tel Aviv, with 14 aircraft on order planned to fly from Lydda in the U.S. via points in Italy, Switzerland, France, England, East and West Germany, the Azores and Canada. Operations in 1948, the company is partly owned by the Israeli government.

At present, the carrier owns two DC-4s which it will have operating to Rome and Paris. Possible air service would, generally DC-4s at Copenhagen, it anticipated, officials told CAB.

More Irregulars Cited By Board

Enforcement action against four more large irregular carriers charged with illegal operation has been announced by the Civil Aeronautics Board.

Pensacola Air Transport, Miami Springs, Fla., and Miami Air Transport, Inc., both of Miami, Fla., were cited and the Civil Aeronautics Board's letter of registration should be gevealed for "leasing and selling" quota form of the Civil Aeronautics Act. Both allegedly late operated with excessive frequency and regularly and persistent rate violations, despite warnings from CAB.

► **Trotter-Cited**—Trotter has been specifically active on the New York-Tampa route to Detroit, carrying passengers and cargo. Trotter has been flying the New York-Miami-San Juan and New York-Los Angeles-San Francisco route.

Arnold Air Service, Anchorage, Alaska, which flies to the north west, should not be allowed to expand and depart from further restrictions of federal economic regulation. The company is accused of operating with excessive frequency and regularly between Anchorage and Seattle.

Airline Viperton Carriers Inc., Reseda, Calif., was ordered to stop leading the public to believe, directly or indirectly, that it operates regular flights between any two or more points. The transcontinental carrier was forbidden to operate more than eight roundtrips between any two points during any four consecutive weeks.

Davis Confirmed

Nomination of Thomas W. S. Davis as assistant secretary of Commerce #48 was approved by the Senate.

An appeal against an United Air Lines President W. A. Patterson, Davis was denied to the post last month by President Truman. The action in the Commerce Department will stand for the next 30 days to await confirmation.

New Star Route Contracts Readied

The Post Office Department is preparing to let its last contracts under air route route legislation recently passed by Congress.

CAB has been asked to certify that operation of a new route from Honolulu to a major colony on the island of Molokai and continuation of an existing one, from Chaffeeon, Mich., to St. James, Mich., will not conflict with development of air transportation under the Civil Aeronautics Act.

► **Replies Mail**—The proposed Honolulu-Island route from Honolulu to Kahoolawe, Maui, a 54 miles long extension, the latter mentioned, is expected to be certified if the route of Molokai by a 1000 ft. premium. Mol is now forwarded on Kahoolawe by messenger on switchback.

The 400 persons at Kahoolawe, including military personnel, receive about 155 lbs of mail daily and demands about 30 lbs. Post Office wants bids for a package board to operate daily roundtrips from Kahoolawe's small airfield from Honolulu.

The 55-mile Cheboygan-St. Ignace route is operated during summer when Lake Michigan is frozen over.

St. Ignace is on Beaver Island in the lake and receives mail service by power boat during the open season of navigation.

Pioneer Moving

Dependence of its present facilities at Houston, Tex., Municipal Airport, Pioneer Air Lines plans to shift its general offices and maintenance base to Love Field, Dallas.

The Air National Guard, which has a 99-year lease on the federation's Houston Marine base, gave PAL Oct. 12 to move although an extension of the facility may be granted. Pioneer will build a hangar and office building

EDITORIAL

Stop the Gibble-Gabble

There must be something to this bargin bin business. After all, Seven come continental airlines introduce or extend lower passenger rates while a few die-hard skeptics stand by and say it can't be done.

Eastern Air Lines starts its first four non-stop flights from New York into the South, and will extend them further next month.

Capital opens an coach service from New York to the South and Southeast.

National Airlines and Eastern will open New York-Maine coach service in November.

Northwest extends its coaches to include a Chicago-Pacific Link.

Western will soon start coach flights connecting major Pacific Coast cities.

TWA won permission from CAB to continue its DC 1 coaches a few months longer between Kansas City and the West Coast.

Tropicana Air Lines starts a reduced rate coach fare plan.

It may well be that all of these experimental services will not pay off. But at least these courageous operators are willing to try it, and we wish them well. At least they are not spending all their time over the old rates, proving it can't be done, or waiting only for higher and better payments from the Post Office Dept.

The skeptics are going even further than claiming all air coaches are impractical. They are oversimplifying the case by announcing that admittance of air coach service have been placing it at the sword of the industry. One last word, admitting an advantage or two, and hastily, "But to regard coach services as a panacea for the industry's basic troubles is absurd!" No one that we know has painted the air coach picture at the sole answer to the industry's prayers. It is perhaps significant to note that this same skeptic also takes a stand against separating service road rates from subsidy payments to the industry.

We hope the air coach skeptics will stop setting up the "air coach panacea" straw man in order to knock him over.

Give the air coach a chance. Whatever it works we will make progress, whatever it doesn't, we should stop it. But let's stop the gibble-gabble and the constantly howling and try to fly the realists.

Publicity for Contracts

Today, Aviation Week offers another new industrial intelligence service to its readers. Today and monthly thereafter, we shall list the latest negotiated contracts of

\$100,000 or more, placed with industry by the U. S. Air Force.

Month ago, we began publishing USAF bid intentions, and would make other competitive bidding such listings, originally produced only by Aviation Week, are now sent directly by Wright Field to this magazine, as well as other publications.

The negotiated contracts, however, have never been regularly published, and today's listing mark the public nature of a man's persistent and continuous efforts by Aviation Week to clear away the mystery from these transactions.

Our first request for such information was sent to Wright Field in August, 1948. We continued our efforts both in Dayton and Washington. Editorials on the subject appeared in this magazine Nov. 22, 1948, and June 4, 1949.

Our entreaties finally were made personally to Air Force Secretary Syrington, who agreed with our contention that all Air Force contracts, except a few involving secret materials or products, should be announced quickly.

Even after Mr. Syrington's approval, however, his under secretary of the air force, Arthur S. Barnes, strenuously objected to such publicity on the ground that the government would then be liable to disclosure of a bargain with industry if individual negotiated contracts were published.

For four or five months Mr. Barnes and Wright Field blocked distribution of the contract information to Aviation Week by a variety of delaying tactics and mail stops.

The law, still in no complete, and we have yet to receive listings of contracts under \$100,000, which we have also requested for publication. These have been promised, however.

We have faith in Mr. Syrington and in his determination that his order will be carried out. We can guarantee the Secretary on the condition is Air Force policy, and venture the suggestion that if the Air Force had thus subjected all of its surface contracts to the full light of public scrutiny, the sensible Army Materiel Board would have been delighted long before it reached the astronomical proportions that it did.

We believe that any disclosure of the kind Mr. Barnes fears will be more than offset by the long term advantages of letting the public know its money is being spent.

We remind Mr. Barnes that it has long been the practice of this government to reveal such information. No other government agency that we know of attempts to hide from the press its domestic contract with industry, or other general expenditures.

Robert H. Wood

ZERO reader

the pilot's instrument

See Sperry's knowledge and experience in developing precision flight instruments to make flying easier for the pilot under SE conditions is reflected in the new ZERO READER. truly, the pilot's instrument.

See For the ZERO READER combines the type of information usually supplied by five essential instruments — reduces the pilot of complex mental calculations — gives him more time to concentrate on other factors vital to the success of his flight plan.

See The ZERO READER — developed by Sperry with the encouragement and cooperation of All-Weather Flying Division, USAF and the Air Transport Association — makes military and commercial aviation increasingly independent of weather. Helps pilots to make cross-country flights, approaches and landings with greater ease and safety regardless of visibility.

See The ZERO READER takes its place in a long chain of Sperry "firsts" including the Gyro-Harmon, Directional Gyro, Gyrogyr Compass and Gyroplot. Like these, it was evolved from Sperry research, engineering, precision manufacture and flight testing.



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It's the "EXTRAS" that make this

Beechcraft a better buy!



★ **Extra speed** — The Beechcraft Bonanza achieves its high speed *without engine overload*—170 mph cruising speed at 8,000 feet using but 56% of the maximum rated take-off power. You buy a plane to *make time*. In a Beechcraft, you *get it!*

★ **Extra ruggedness** — Beechcraft Bonanza framework is stronger than conventional construction. Shock and stress tests far surpassing CAA requirements have proved the extra ruggedness of every inch of the Beechcraft Bonanza—from landing gear to cabin roof!

★ **Extra economy** — Extra low fuel consumption of 9.5 gallons per hour at cruising is part of the Beechcraft Bonanza's operating economy. Another vital "extra" is low maintenance due to freedom from engine overload. The Beechcraft Bonanza saves your money!

★ **Extra safety** — The Beechcraft A35 Bonanza has been dived under radio control at 275 mph—and pulled out unscathed at 3 G's! On the ground, the Beechcraft Bonanza's wide tread, long wheel base, and cross-braced struts defy the roughest handling, the roughest terrain.

★ **Extra performance** — No airplane yet designed can beat the high performance of the Beechcraft Bonanza—its unexcelled combination of speed, range, and fuel economy. Its flight characteristics make it one of the easiest planes in the world to handle!

Compare these performance features

- Top speed, 184 mph
- Cruising speed, 170 mph
- Range, 750 miles
- Service ceiling, 17,100 feet
- Fuel economy, 9½ gal. per hour

Compare these comfort features

- Exclusive retractable step
- Limousine entrance
- Insulated, sound-proofed cabin
- Quickly removable rear seat
- Luggage compartment accessible two ways

★ **Extra power** — The extra margin of power in a Beechcraft Bonanza comes from aerodynamic design which requires but 56% of the engine's power at cruising. Never before has so little power been needed for such high performance by so rugged a plane!

★ **Extra range** — The extra range you get in a Beechcraft Bonanza—750 miles—makes it *real transportation*. Equipped for long distance flight, it is the most practical of all planes for business use—with a *commercial* margin of safety, speed, and range!

★ **Extra utility** — The Beechcraft Bonanza is a business plane, engineered for extra usefulness as a business vehicle. It can be operated the year around. It can get into small, unpaved landing fields as well as modernized airports. It is ready to go—365 days a year!

★ **Extra comfort** — From the moment you step (not climb!) into a Beechcraft Bonanza through its wide, auto-type door and settle yourself in its uncrowded 4-place interior, you're conscious of superb comfort. Its sound-proofing is the standard of comparison!

★ **Extra luxury** — Skilled design and placement, with superb interior appointments, make the Beechcraft Bonanza an aerial limousine. You'll lean back and relax and enjoy air travel as never before! Its only rival for sheer luxury is the multi-engined airliner itself!

• These are only the highlights among hundreds of reasons why the Beechcraft Bonanza is a better buy! See it today! A note on your company letterhead will bring illustrated brochures describing the Beechcraft Bonanza's many *extra* advantages. Write to Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

Beechcraft

BONANZA

MODEL A35

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS